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SIXTY-THIRD YEAR OF PUBLICATION

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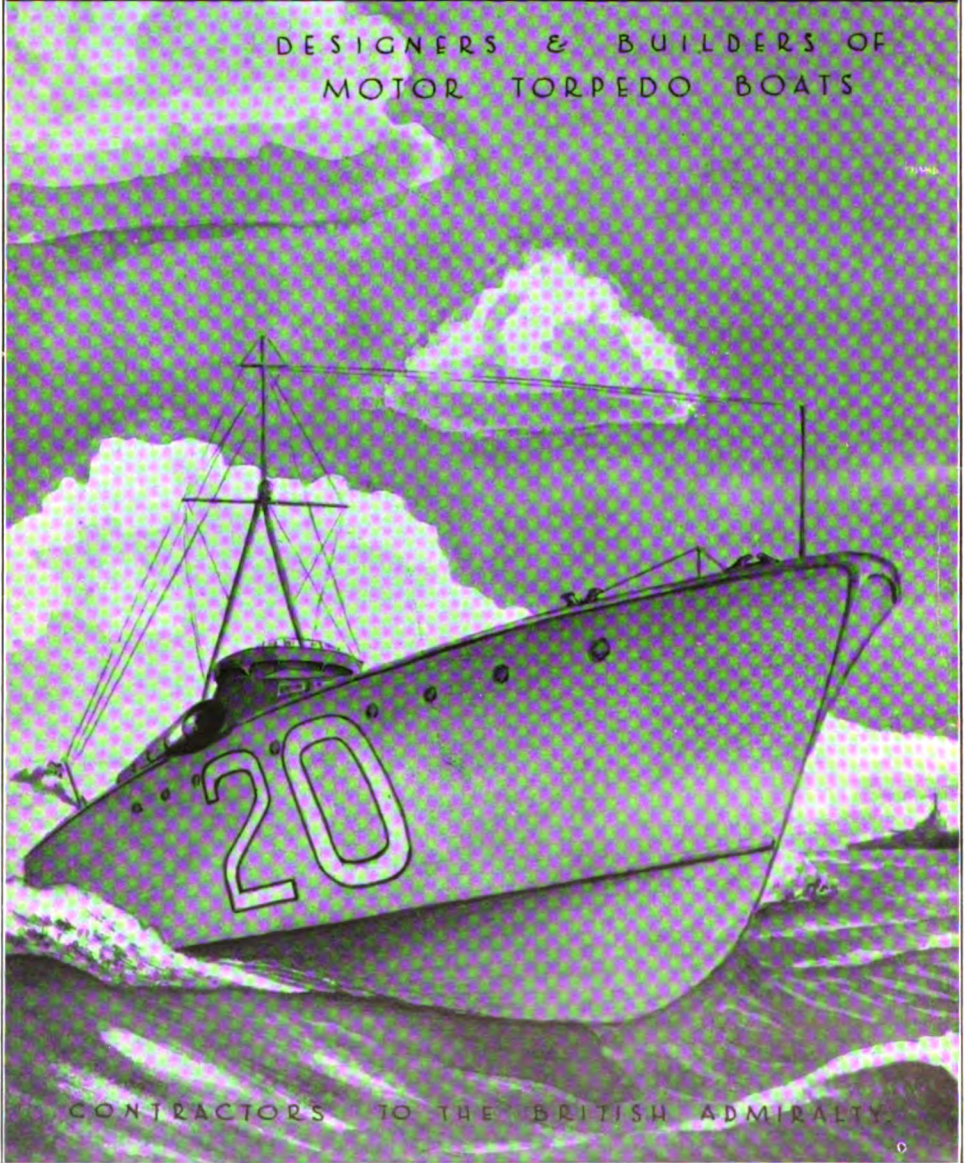
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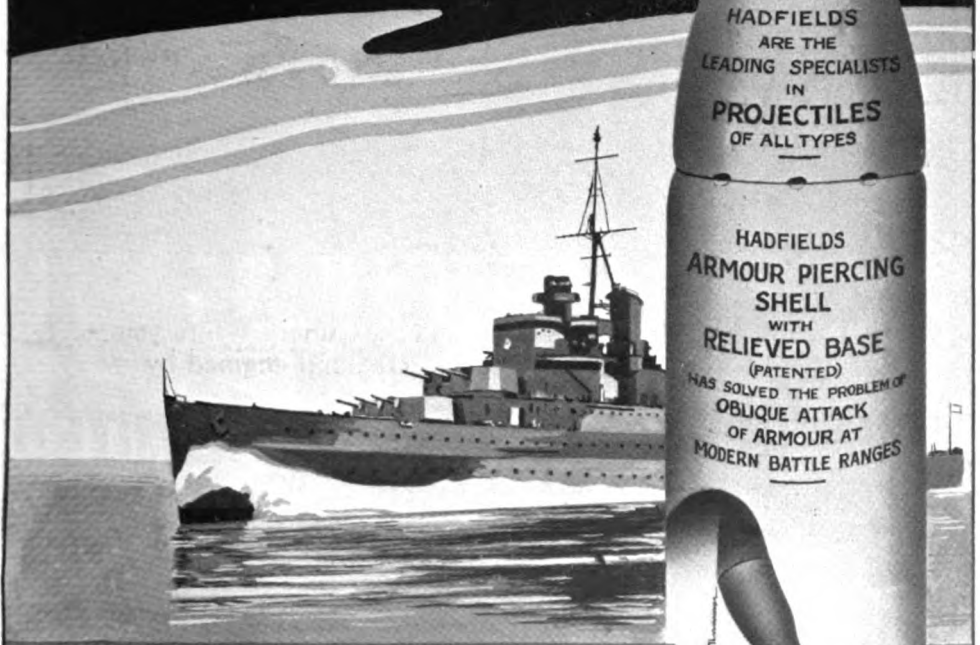
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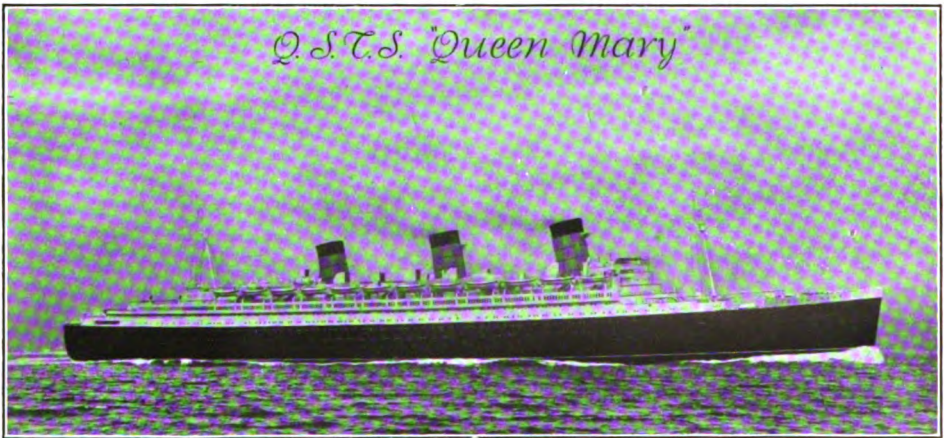
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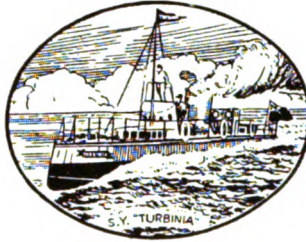
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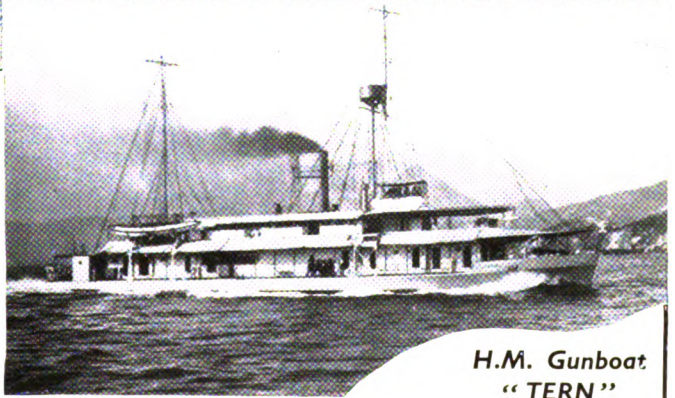
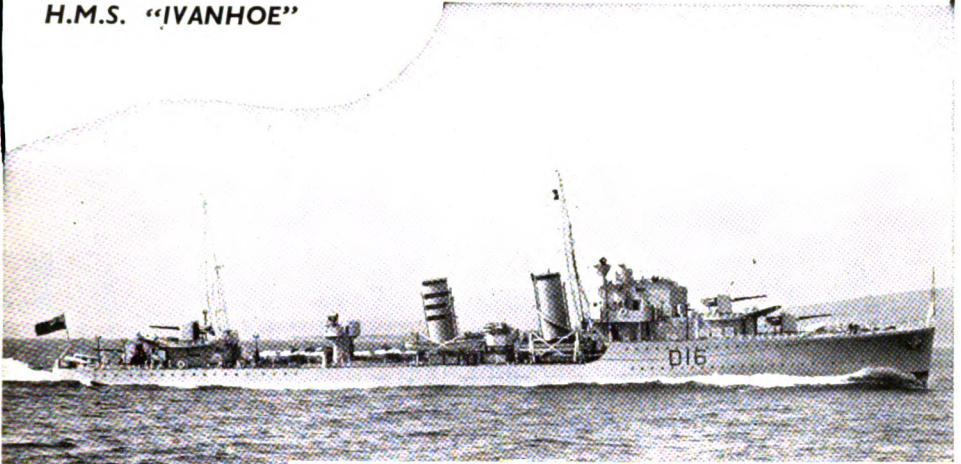
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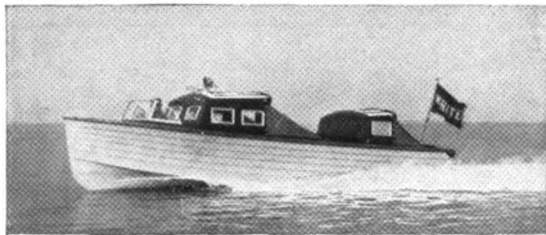
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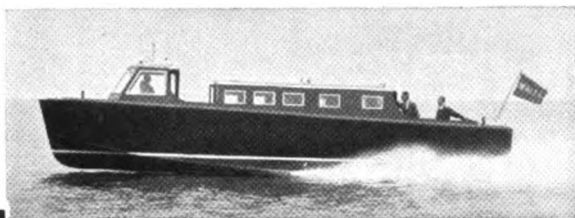
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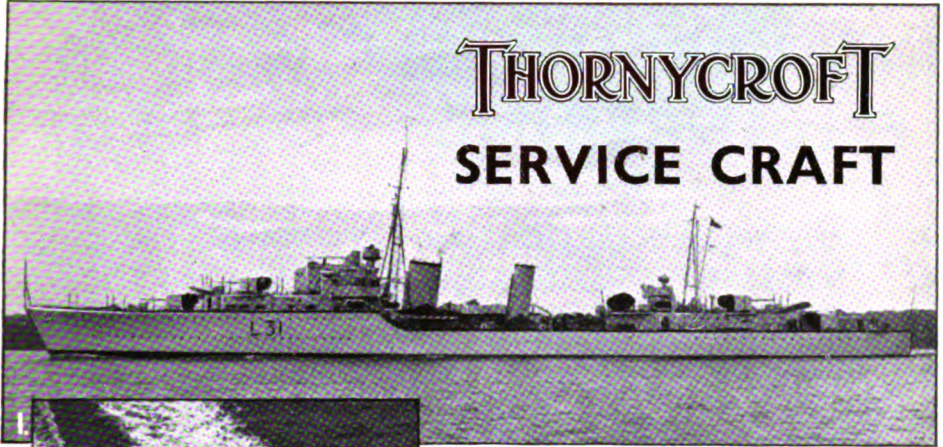
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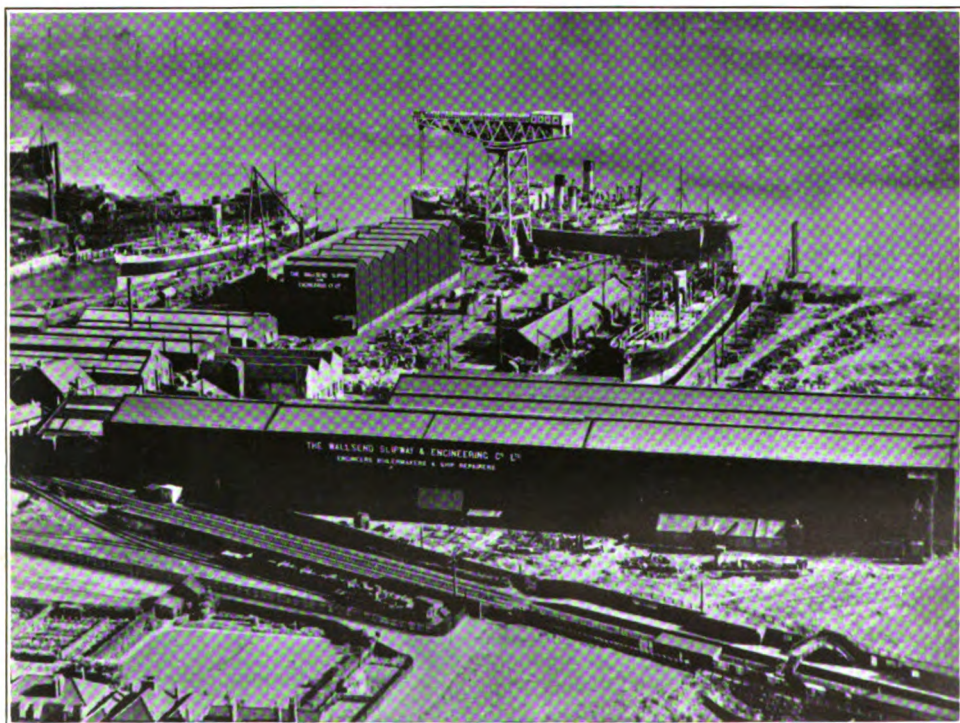
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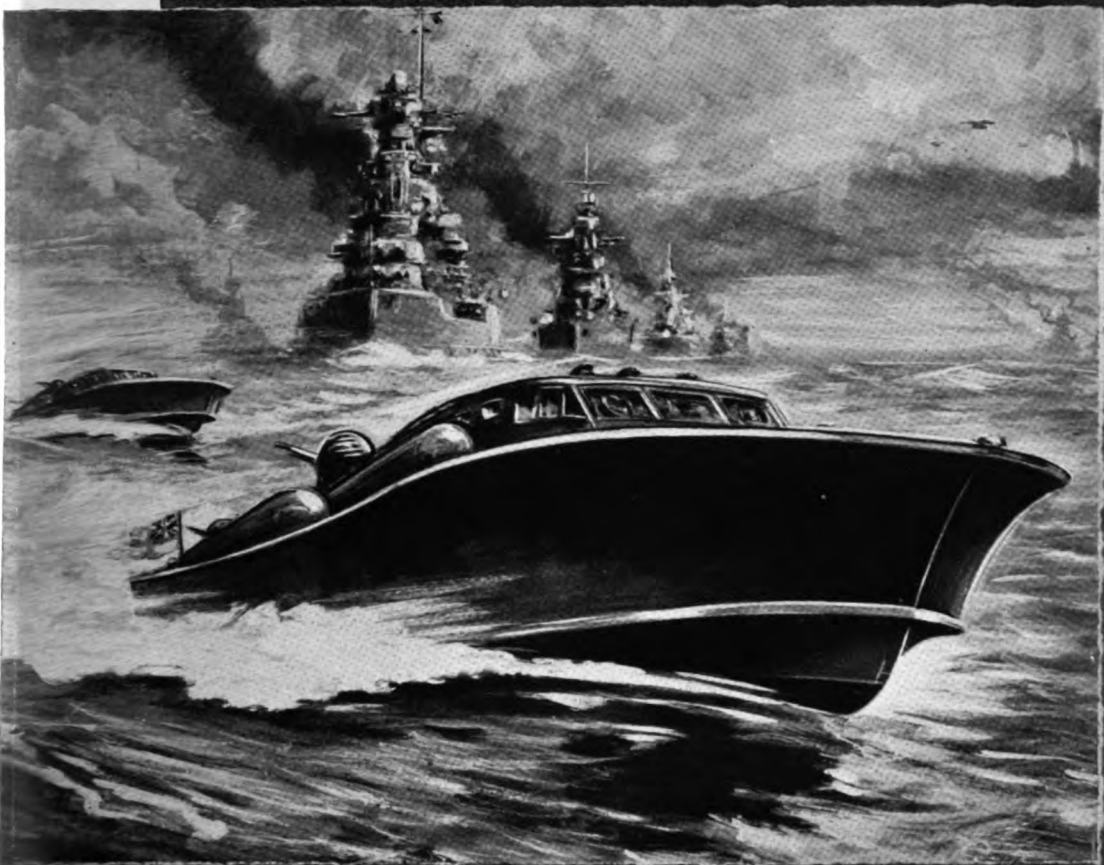


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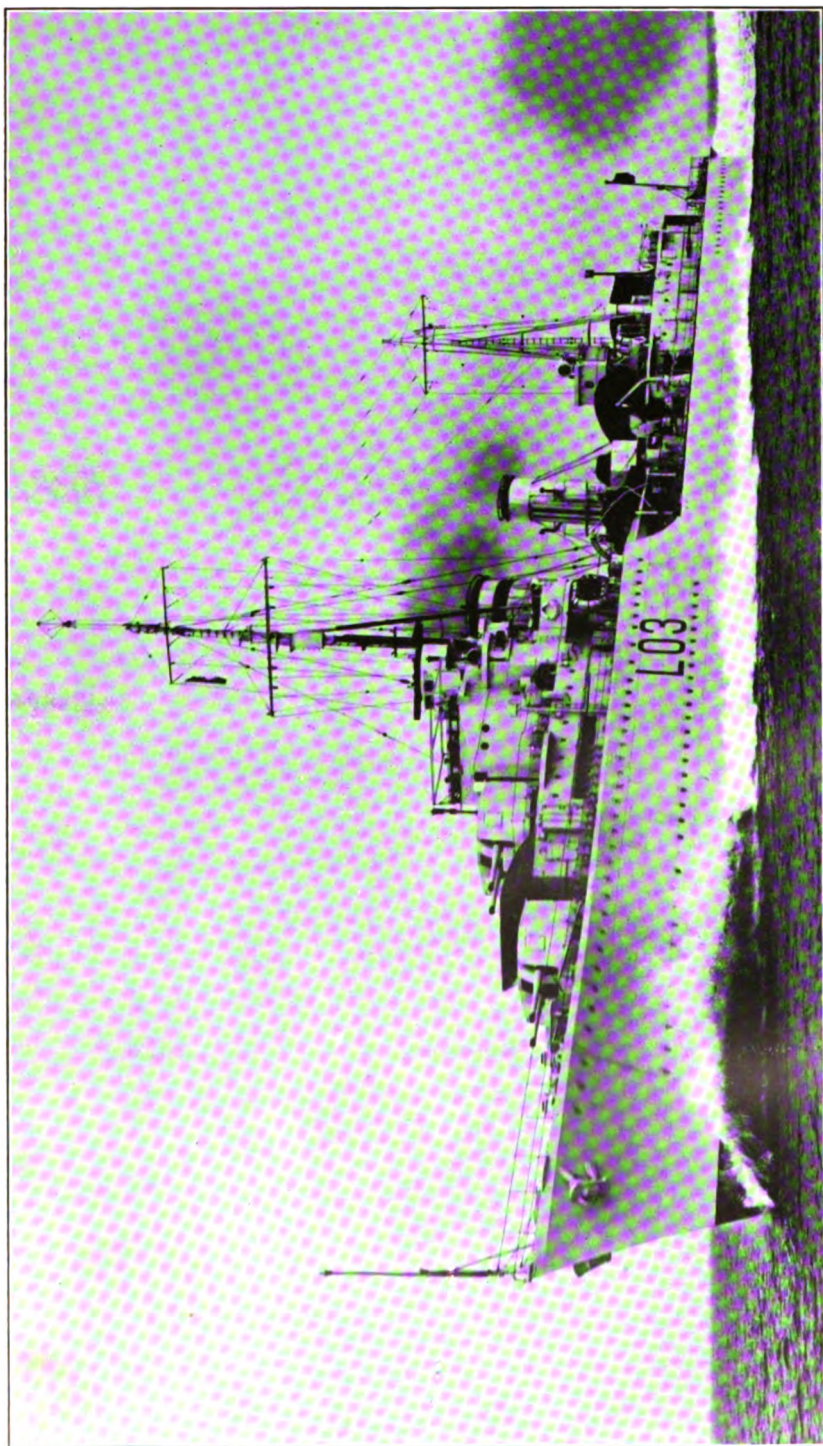
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PREFACE.

"BRASSEY'S NAVAL ANNUAL" is again published as soon as possible after the Navy Estimates for the current year, 1939-1940, are available. In order for this to be possible, the bulk of the book, with the exception of the Introduction, has to be in the press early in the New Year, and therefore deals only with the year 1938.

For the Naval Section, in this, the fiftieth year of publication, I have been fortunate in securing a chapter from the pen of Sir Archibald Hurd, himself a former editor of "Brassey." He writes on a subject of the highest importance to this country, of which he has made for many years a special study—the maritime industries, shipping and shipbuilding, and the national danger arising from the parlous state into which they have been allowed to fall to-day. Captain H. T. Dorling, R.N., well-known to all readers of books on the sea under his pen-name of "Taffrail," writes on the same subject, chiefly from the point of view in which he has taken a deep interest, that of the personnel. As in recent years, Captain Altham summarizes the progress of foreign navies and Mr. Hurford reviews the relative strengths at sea of the principal naval Powers.

The Hydrographer of the Navy, Vice-Admiral J. A. Edgell, has been good enough to contribute a sketch of the work and growth of the Department over which he so ably presides—a work in which, for a century, this country has been the pioneer, to the great benefit of mankind as a whole. Commander Russell Grenfell contributes a thoughtful analysis of the much discussed question of cruiser design. Commander Pursey traces in detail the development of lower-deck training in the Royal Navy, together with a sketch of the systems in force in foreign navies. In place of a chapter devoted wholly to one foreign Navy, I have included this year an account of visits to most of the navies of South America by a contributor who prefers to remain anonymous, but who was obviously a highly sympathetic and appreciative visitor. Finally, I have included a penetrating essay on "Command of the Sea" from Dr. Herbert Rosinski, who is not only widely read in what may be termed the classics of naval strategy, but has also kept in close touch with contemporary thought, as expressed in the recent publications on the Continent to which he draws attention. His analysis brings out very forcibly two points; the fundamental importance to success in war at sea, often ignored by superficial students and critics of British sea strategy in the late war, of a firm grasp of the "command"—provided in the late war by the maintenance at full strength of the Grand Fleet, in spite of all other urgent calls on the available ships; and the innate dependence, for their real efficacy, of direct

defensive measures such as convoy upon the unremitting maintenance of the command.

In the Naval Air Section, it is noticeable that less and less official information is available to the public, both at home and abroad. There are the usual chapters on progress in British and Foreign services. Two contributors, who prefer to remain anonymous, deal from rather different aspects with the subject of the Interdependence of Home Defence and Trade Defence. It will be noticed that they hold and express views which are opposed to one another regarding the practical effect upon national strategy and organization of the versatility which is such a marked characteristic of air forces. Squadron Leader Burge, the founder and first Editor of the *Air Annual*, describes the recent and future development of flying boats, and Colonel Burchall, the General Manager of Imperial Airways, again describes the year's work on the problem of a regular Trans-Atlantic air service.

By the kind permission of the Director of Naval Construction, Mr. M. C. Dunstan has again undertaken the revision of the Tables, Profiles and Plans of the Reference Section. The information in these is based on the latest figures that have appeared in various publications, and is believed to be accurate even if in a few cases it has not yet been confirmed officially. I am indebted to the Naval Attachés in London, of the United States of America, Argentina, Brazil, France, Germany, Italy, Japan and the Netherlands for their courtesy in replying to queries and supplying information. And I desire again to acknowledge gratefully the assistance in various ways of Mr. G. H. Hurford.

H. G. THURSFIELD.

INTRODUCTION.

THE policy adopted four years ago of restoring the Defence Services to the full strength and efficiency demanded by the international conditions of to-day continues to govern Service affairs. The only difference to be noted is an intensification of the process of re-armament, a quickening of its pace. Since the period covered by the review of naval events in 1938 contained in Chapter I, various new measures have been taken by the Admiralty to improve the condition of preparedness of the Navy or to lessen the time necessary to bring it to full efficiency on mobilization. Certain other countries living under "authoritarian" regimes, are at an advantage compared with those whose governments are democratic, in that, if they decide to bring their armed forces to a war footing, they can do so unostentatiously, without publicity or exciting public comment. Not so democratic countries, which are under the necessity of obtaining popular authority, through Parliament, for the general lines of their defence preparations, and can take no step towards mobilization without the publicity of Proclamations. The latter may often in times of tension, be considered inadvisable as tending to exacerbate a political crisis which it is hoped to surmount without bringing matters to a head. But the result is that in the event of a clash precipitated by an authoritarian State, a democracy may find itself unready and taken at a disadvantage. If democracies are to survive in the struggle of "rival ideologies"—to use the political jargon of to-day—which appears to be developing, they must take to themselves some of the practical advantages of the totalitarians in this respect. The following measures seem to be directed to this end.

IMMEDIATE RESERVE.

On January 28, the Admiralty announced the revival of the "Royal Fleet Reserve, Class D, Immediate Reserve," which was first created in 1912 but had been allowed to die out after the war. It consists of a portion of the ordinary Fleet Reserve, of Able Seaman and Leading Seaman rates and their equivalents in other branches and in the Marines, who undertake to come up for service at any time when called up by individual notice, even though no Royal Proclamation embodying the Reserves has been issued. Men can enrol in the new class either by transfer from the existing Class B of the Royal Fleet Reserve or direct on discharge from active service, for a period of five years. Those who do so must hold themselves ready for immediate service and must not, therefore, undertake national service in other spheres or for other Services. Members of Class D draw a retainer of 1s. a day, which is double the normal,

and are paid an allowance for upkeep of kit. They are required to do fourteen days' training in every alternate year. On being called out for service by individual notice, they receive the usual Reservist's bonus of £5, and are required to engage for three months' service, if so long needed. In the event of the Reserves being called out by Proclamation within that three months, they will be absorbed in the ordinary Fleet Reserve.

It will be noted that the re-creation of the Immediate Reserve puts in the hands of the Government something of the power possessed by "authoritarian" regimes to bring forward towards a war footing a part of the Defence Forces, without publicity. One of the difficulties which was discovered in the mobilization of September 1938 was due to the depletion of the mobilization staffs in the Naval Depots, by drafting them to ships just when their services were most urgently needed to cope with the Reservists coming in. If the Immediate Reserve is called up, when they have been embodied for a few days, not only can a good start be made with getting ships of the Reserve Fleet ready for sea, thereby substantially shortening the time necessary to bring them into service, but the Depots can be fully prepared to cope with a full mobilization whenever, and if, it comes. For that reason, there need be no inducement to resort to full mobilization before it is beyond all doubt that it has become necessary; and if no mobilization follows the embodiment of the Immediate Reserve after all, the whole process will have been very much less expensive than it was, for instance, in September, 1938.

FURTHER ENTRIES OF OFFICERS.

At times when the Navy is expanding, particularly when, as at present, the expansion is rapid, ships can be provided more quickly than can qualified officers. There is no shortage in the supply of executive officers through the three regular channels—cadets from Dartmouth, direct-entry cadets from public schools, and promotion to sub-lieutenant of specially selected young seamen. But increased entries through these channels do not produce an increase in the number of lieutenants for watchkeeping duties for periods varying from four to ten years. Interim measures are therefore necessary.

In 1937 and 1938 some 250 commissions in the Navy were given to lieutenants and sub-lieutenants in the Royal Naval Reserve. The following further measures were taken in 1939.

RE-EMPLOYMENT OF RETIRED OFFICERS.

The Admiralty announced on January 26, 1939, that they would be ready to consider applications for re-employment from lieutenants, and lieutenant-commanders on the Retired and Emergency lists. Those under the age of 40 would be preferred. Employment would be at home only, and would be in the first instance for three years. Retired officers would receive the full pay and allowances of their rank with a bonus of 15 per cent, retired pay being suspended; Emergency officers would receive full pay and allowances. The response to this offer has been very good.

PROMOTION OF WARRANT OFFICERS.

The following measures were announced on March 11. A number of executive Warrant Officers, between the ages of 25 and 36, are to be promoted to lieutenant. The officers will be selected by the Admiralty without the necessity of applying—though no officer will be selected against his will—and will be given a special course of about 4 months in navigation and signals. Those recommended on completing the course will be promoted to acting lieutenant, to be confirmed when, after 6 months' sea service, they obtain the usual certificate of competence as officer of the watch. They will be allowed to count half their seniority as warrant officer towards their seniority as lieutenant. It was later announced in Parliament that probably some 50 warrant officers would be thus promoted in the forthcoming year, and it was understood that selections would be made in batches of about ten.

This measure has been widely welcomed. It has at length disarmed the criticism, frequently heard of late years, that the Admiralty, while paying lip-service to the principle of "making the ladder from lower deck to quarter deck easier to climb," have in fact reduced lower-deck promotions almost to vanishing point, while at the same time largely increasing the intake of officers from outside the Navy. The numbers of selections at an early age for special training for promotion is being increased. Out of 31 candidates who passed through the training course in 1938, 17 were promoted to sub-lieutenant. Forty-two candidates are under training in 1939, and it may well be that the experience of the first course has influenced later selection and training, so that perhaps a larger proportion may come up to the standard required for promotion. The numbers through that channel are thus rising, but however careful and conscientious the selection at the early age, it cannot ensure that no man who has it in him to make a good officer will be missed.

The promotion of warrant officers at a later age now ensures that any suitable man who is missed by the early selection has a later chance to prove his worth. In present conditions, able or outstanding men can reach warrant rank at or soon after the age of 25. It may well be that such a man, selected for promotion to lieutenant under the new scheme, will be little older for his commissioned seniority than his contemporary selected early; and if so, he should have just as good a chance as any other officer to rise to the highest ranks in the Service. This latest measure should ensure that every man of the lower deck who possesses the qualities of character and ability necessary to fit him for commissioned rank will have the chance to achieve it.

OFFICERS FROM THE MERCHANT NAVY.

Further commissions as sub-lieutenants or lieutenants, R.N., are to be granted to officers of the Royal Naval Reserve, on the same lines as during the last two years. Officers to be transferred are selected by the Admiralty from those who apply. Those who have undergone the normal long—9 months—training period in a man-of-

war are transferred as lieutenants, or as acting lieutenants until they have gained the ordinary watchkeeping certificate. Those who have not done the long training period are transferred, as lieutenant or sub-lieutenant, on probation for 9 months before being finally accepted.

This method of entry is now to be open also to officers of the Merchant Navy, who are sufficiently qualified as sea officers to have gained a Second Mates or higher certificate, even though they are not members of the Royal Naval Reserve. Such officers will serve for a year on probation before being finally accepted.

SEA EMPLOYMENT FOR OFFICERS OF THE R.N.V.R.

Employment in the Fleet for 3 years is offered to officers of the Royal Naval Volunteer Reserve and members of the Royal Naval Volunteer Supplementary Reserve between the ages of 21 and 30. Those so employed will not be regarded as fully qualified for any sea-going duty, but will be trained only for the special positions in which it is intended to employ them. On acceptance, they will undergo a course of about a month in a naval shore establishment, followed by 3 months in a destroyer. They will be employed chiefly in destroyers.

In adopting these four measures described above, the Admiralty are making no innovation; they are merely drawing upon the well-tried sources which supplied officers for the Navy in the rapid expansion called for in the Great War. The expansion now in progress is of the same emergency character as that of 1914-18; and until the normal methods of entry can overtake the increase in the number of officers needed, it is manifestly wise to neglect no source of which past experience has proved the suitability.

NAVAL AUXILIARY VOLUNTEERS.

After the crisis, as noted in the Review of the year in Chapter I, some surprise was expressed that men living at Portsmouth who, in time of emergency, desired to serve in some naval capacity, could only join the Royal Naval Volunteer Reserve if they were able and ready to go to Hove for their drills. It seemed incongruous that there should be no naval opening for volunteers at the country's principal naval base. The incongruity has now been removed. On February 20, the Admiralty announced that a "Volunteer Naval Auxiliary Company" would be formed at Portsmouth, to operate the minesweeping and boat services of the port in time of emergency. The age limits for volunteers would be 18 to 60; they would be required in the course of the year to attend a course of 20 evening lectures in H.M.S. Vernon, carry out five days' boat work at week-ends, and do a week's cruise in a minesweeper during which they would receive pay at naval rates. They would be required to undertake to come up for service when called upon by the Commander-in-Chief, Portsmouth, and in the event of mobilization to join the Navy for the period of hostilities only. Men completing their training and qualifying would draw a bounty of £4. It seems probable that similar companies will be formed elsewhere.

THE WHITE PAPER ON DEFENCE.*

The White Paper on Defence was issued in 1939 on February 15. It opened with the statement that the borrowing powers conferred on the Government by the Defence Loans Act of 1937, authorizing the raising by loan of £400 millions for Defence between the years 1937 and 1942, were now proved to be insufficient. The Government were therefore seeking powers to double the amount that might be borrowed in that period.

The necessity for this increase had arisen as follows. The expenditure on the Defence Services for the forthcoming financial year, 1939, would be £523 millions—against £328 millions in the current year and £262 millions in 1937. The total Defence expenditure in the first three years of the quinquennium would thus be over £1,173 millions; and moreover, there would be a large expenditure, amounting to over £40 millions, on measures of civil defence—Air Raid Precautions and the purchase and storage of essential supplies. At the end of the financial year only £203 millions would remain of the original borrowing powers; this would be insufficient to finance the expenditure of the next year. Furthermore, the total cost of the rearmament programme would substantially exceed the £1,500 millions estimated two years ago, though arrangements were constantly made to provide that, in the event of any improvement in the international situation, bringing with it a diminution in the country's defence needs, the programme could be suitably adjusted.

One cause of the increase in defence costs was the ever-increasing complexity of modern armaments. But the chief reason was the fact that, in order to make adequate provision for defence against the contingency of air attack, it had been necessary to expand the original programme.

The White Paper then dealt with the individual Defence Forces in detail. For the Navy, comparative figures were given of the tonnage under construction on January 31, or each year from 1935 to the present, and on March 31, 1939, showing a steady rise throughout. An outline of the 1939 building programme was then given—for the full programme, see the Navy Estimates, below—and mention was made of the progress which was being made in the modernization of certain existing capital ships. A review of the increase in personnel since 1932, when numbers were at their lowest, showed an increase since then of more than 36 per cent. up to 1938; there would be an even greater increase in the forthcoming year, due very largely to the necessity of making provision for the Fleet Air Arm. For that purpose, some 2,000 men would have been added to the Navy by the end of the financial year, and a further increase of 4,000 would be made in 1939. The transfer to the Admiralty of the aircraft, stores, equipment, and aerodromes of the Fleet Air Arm would be made early in the financial year. It would be necessary to supplement the aerodromes to be transferred by the construction of new ones and by sharing stations of the Royal Air Force.

* See p. 357.

As regards the Army, its equipment with up-to-date weapons and the provision of reserves thereof were proceeding rapidly, but additional anti-aircraft equipment was to be provided. The construction of new Royal Ordnance Factories was being accelerated. The recruiting position had greatly improved, and the number of candidates now exceeded the demand—thus reversing the state of affairs of two years ago. The Territorial Army, too, was much better than it had been, being nearer its established strength than at any time in its history. Five divisions were over strength, and the average for the whole was over 90 per cent. of establishment. The number of its Anti-aircraft Divisions had been increased from two to five, and they had been organized as a whole under a Corps Commander ; the appropriate machinery had also been created in the War Office to administer this form of organization. The Field Force of the Territorial Army had also been reorganized, so as to conform with the Regular Army.

With regard to the Royal Air Force, various measures had been adopted to broaden the basis of supply and to accelerate production. As a result, the delivery rate had been more than doubled in the last year and would be still further increased. Recruiting continued to be good ; 35,000 would have been entered during the current year by the time it reached the end, and 20,000 would be required in the next financial year. Training facilities were still being extended ; twelve Service Flying Training Schools were in operation and three more would shortly be opened ; flying training was being carried out at over 30 civil Flying Training Schools. The Royal Air Force Volunteer Reserve was being expanded by the creation of branches corresponding to all the various branches of the regular R.A.F.

By March 31, 1939, the strength of the Metropolitan Air Force would be 1,750 machines ; its expansion up to 2,370, with an overseas strength of 500 exclusive of the Fleet Air Arm, was continuing according to programme. The Balloon Barrage scheme had been extended to the provinces and now comprised 47 squadrons.

The White Paper then dealt with the subject of Civil Defence, and mentioned the appointment of the Lord Privy Seal as the Cabinet Minister to take charge and co-ordinate all aspects of it. Various measures in this province come under other Ministries—Home Office, Ministry of Health, etc.—and a great part of the work is within the functions of Local Authorities. It was thus all the more necessary to provide a co-ordinating authority. The steps taken to organize National Service on a voluntary basis were outlined. There were still shortages in certain areas, and in particular in the Auxiliary Fire Service in most areas. Other A.R.P. services were already over strength.

£20 millions was being spent on steel shelters for small houses, strengthening basements and making permanent those of the trenches dug in September which are suitable for that process. Hospital accommodation was being organized on a war basis. Evacuation schemes had been overhauled and completed, and were ready to be put into operation when and if needed.

The White Paper concluded with an expression of the Government's deep regret that the vast expenditure outlined should be necessary. British armaments had no aggressive purpose, and though this country would be at any time ready to join in a general scheme for the limitation of armaments, it was inevitable that it should be obliged, in present world conditions, to provide adequately for its own defence.

THE NAVY ESTIMATES.*

The Navy Estimates were issued on February 28. The total was the largest ever presented to Parliament, £149,939,000, some £23 millions more than the year before. The amount to be met out of revenue, however, was £26½ millions less than last year, as loans were to be increased from last year's figure of £30 millions to £80 millions.

The largest item in the bill is, of course, new construction, the heavy programmes of the last few years being now just at the most expensive stage. The new construction programme of 1939 would be—

- 2 battleships
- 1 aircraft carrier
- 4 large 6-inch-gun cruisers
- 2 Flotillas of destroyers (16 boats)
- 4 submarines
- 20 fast escort vessels of a new type, intended chiefly for protection of merchant ships against submarine and air attack
- 10 minesweepers
- 1 fast minelayer

and a number of minor craft, including a new hospital ship to replace the 37-year-old *Maine* and a new Royal Yacht, which in time of war would also be available as a hospital ship. The total cost of this programme would be some £60½ millions.

The usual notes on naval matters of general interest were attached to the First Lord's Statement. The subject matter of most of these is covered in Chapters I and XI of this volume, so it is unnecessary to review it again here. It was mentioned, however, that the monitor *Erebus*, which has been replaced as harbour training ship for Naval Cadets at Portsmouth by the Reserve Fleet cruiser *Frobisher*, is being refitted in order to be stationed at Capetown, pending the installation of the fixed defences on shore there.

The *Cairo* and *Calcutta*, C-class cruisers, are being converted to Anti-aircraft ships, and other ships of the same class are to be similarly converted during 1939. The mine-laying submarine *Seal* is to relieve the *Odin* on the China Station on completion of trials. Six more Motor Torpedo Boats are to join the Mediterranean Fleet as the 3rd Motor Torpedo Boat Flotilla during the coming year.

The protection of the Merchant Navy during war continues to occupy the constant attention of the Admiralty. With the co-operation of shipowners, preparations for the fitting of defensive

* See p. 377.

armaments in merchant ships, when needed, are well advanced, and the Shipping Defence Advisory Committee continues to give valuable results.

Vote 4, devoted since 1925 to the "Grant in Aid" of Air Force votes for the cost of the Fleet Air Arm, now disappears from the Navy Estimates. The sums which formerly made it up are now distributed over the various votes, personnel and material, to which they are appropriate. The First Lord's Statement mentions that it will be necessary for some considerable time to supplement the pilots of the Fleet Air Arm by pilots lent from the Royal Air Force. In order to improve the liaison between the Admiralty and Air Ministry in matters of research, development and supply, naval and civil officers from the Admiralty are being appointed to serve in certain departments of the Air Ministry.

Recruiting continues to be highly satisfactory, but there are still vacancies unfilled for direct-entry artificers, of various classes, for the next few years, to bridge the gap before the increased entries of apprentices come into service. Forty-two ratings are now undergoing the special course of training afloat for commissioned rank.

Of material, the battleship King George V was launched by His Majesty the King at Walker-on-Tyne on February 21, and the Prince of Wales was to be launched by H.R.H. the Princess Royal at Birkenhead in May. Their places on the slips would be taken by the two battleships of the 1938 programme, Lion and Temeraire. The three ships of the 1937 programme, Duke of York, Jellicoe, and Beatty, are to be launched during the 1939 financial year. The remainder of the building programme is proceeding according to plan.

The old destroyer Whitley has been converted into an escort vessel by being rearmed with 4-inch anti-aircraft guns. A number of others are to be similarly converted.

Under the heading of Naval Works, it is mentioned that various docks are being lengthened and jetties improved in the Royal Dockyards. Accommodation for ratings of the Fleet Air Arm is to be built at the aerodromes to be transferred to the Navy, and a substantial sum—£130,000—is to be spent on the creation of a naval air station at Hatston in the Orkneys.

Research continues actively. The study of air-flow round ships and their control positions has enabled the conditions in the latter to be greatly improved. Advances in boiler design are in sight. A detailed investigation into the matter of coal-burning by mechanical stoking has been carried out, which has shown conclusively that "on the major counts, weight and space required and operation, a return to coal-burning would impose such a handicap on our ships as to be definitely unacceptable."

On the subject of armament supply, it is mentioned that the country's capacity for production in 1939 is, for guns and mountings, five times what it was in 1935, and for control gear, nine times. This news is reassuring, since it was well known in informed circles in this country, though not of course published to the world, that in the former year one of the greatest obstacles in the way of rearmament was the difficulty of obtaining the supplies of guns,

mountings, and control apparatus needed. Improved performance has been obtained in torpedoes.

THIRD SUPPLEMENTARY ESTIMATE.

On March 4, a third Supplementary Estimate* was issued, finally regularizing the accounts for the current financial year. The cost of the Mobilization of the Fleet in September was tentatively stated, soon after it took place, at £1,000,000. The Supplementary Estimate shows that to have been an under-statement, for it actually cost £1,766,000. The number of men called up was 27,500, and Vote A had therefore been increased in November to authorize that number; the cost was now provided for by this latter Estimate. In addition to personnel, the estimate provides for other special expenditure, on material, which was incurred at the time of the mobilization. The total increase was thus £2,280,000, of which £529,900 was to be met by saving on various votes. The remainder, £1½ millions, would be met by loans, leaving only a token sum of £100 to be voted by Parliament.

THE INTERNATIONAL SITUATION.

It cannot be said that the prospects of disturbance are much less than they were twelve months ago. In the Far East, the undeclared war carried on by Japan on the mainland of China continues. On February 11, 1939, in the course of that war, Japanese forces landed on the island of Hai Nan, to the south-west of Hong Kong, despite the Japanese agreement with France of 1907, and proceeded to occupy it in force. In response to enquiries from Great Britain and France, both of which Powers were of course closely interested in seeing Chinese territory so close to their own possessions occupied by a non-Chinese Power, the Japanese Government gave assurances that the occupation would be only temporary, and would cease as soon as the military necessity for it had passed. To what extent those assurances will prove more effective than, for instance, the Franco-Japanese agreement of 1907 remains yet to be seen. But however that may be, there is as yet no sign of any increase in tranquillity in that part of the world.

In the Mediterranean, the Anglo-Italian Agreement has, it is true, come into force, and Italy has accordingly acceded to the London Naval Treaty of 1936. Moreover, at the moment of writing, the prospects of the Spanish civil war coming to an early end seem to be distinctly more favourable than has been the case up to now. Yet on balance, there is little increase in the prospects of tranquillity in that sphere either; for the improvement in Anglo-Italian relations has merely coincided with a deterioration of those between Italy and France, as a result of the anti-French press campaign in Italy on the subject of Tunis, and the reinforcement of the Italian garrison in Lybia, recently reduced in conformity with the Anglo-Italian agreement. It does not follow inevitably that these signs of dis-

* See p. 375.

turbance herald actual breaches of the peace ; but they are sufficient to check any progress towards " appeasement " which might, if it materialized, lead to an easing of the terrific burden of armaments borne by all great Powers to-day.

Further north, the course of events on the Continent of Europe during the last twelve months points the same lesson. There is, indeed, as pointed out in the White Paper on Defence, no alternative open to this country but to continue to equip itself fully for its own defence against attack.

H. G. T.

NAVAL SECTION

CHAPTER I.

NAVAL EVENTS OF 1938.

THE MOBILISATION OF THE NAVY.

THE most important naval event of the year was the mobilisation of the Fleet in the international crisis which developed in September. This process was set in motion by the issue, on September 28, of four proclamations calling up retired officers of the Royal Navy and officers and men of the various classes of Reserves ; at the same time, though without any public announcement, of course, steps were taken to take up and fit out the numerous auxiliary vessels of which the Navy needs in war, and the ships of the Reserve Fleet began to make ready for sea.

Mobilisation of the Reserves puts a heavy strain on the drafting personnel at the Naval Barracks. At the outset they are heavily depleted, since many of them are needed for service in the Reserve Fleet or other ships, and their numbers are small until replenished by pensioners and Fleet Reservists joining up. As the reservists come in, they have to be medically examined, fed, kitted up, paid, and either accommodated in barracks until required for duty or at once despatched to their war station or ship. The first man reported for duty at 6 a.m. on the morning of Wednesday September 28—the day the Proclamation became effective ; before the end of the day over 4,000 had been dealt with at one Depot ; and in three days some 29,000 men were dealt with. The machinery of mobilisation had not been used for fifteen years, yet it worked admirably ; there were no hitches, and despite the depletion of depot drafting staffs, no man took more than three hours from the time he joined up to pass through the whole process. The men themselves were impressed with the efficiency of the arrangements made for their reception, and the Commodores of the Naval Barracks received many letters of appreciation—a striking tribute, in view of the well-known propensity of sailors to grumble at their food and accommodation.

The mobilisation, however, was not carried through completely. By the end of the week, since tension had eased with the signature of the Munich agreement, the necessity for it had passed. Auxiliary vessels were not actually converted or manned, and those which had been taken up were returned to their owners. Reservists were sent back to their homes on leave, their calling-up notices being considered in abeyance, and those who had not actually joined up were directed not to do so. The Reserve Fleet ships retained the active service ratings of their crews and completed their preparation for service ; but in all other respects, the mobilisation of the Navy was

stayed, though not cancelled. The embodiment of the Reserves was only finally cancelled by an Order in Council issued on November 25. The cost had been approximately £1,000,000.

For the Navy the mobilisation was merely an extremely useful test of machinery long unused—and a test of which the result was eminently satisfactory—but it had a much wider importance than that. It demonstrated to the world the real intentions and determination of the nation with a weight that no verbal or written assurances to foreign Powers had carried ; and in that it undoubtedly had a powerful effect upon the course of international affairs.

THE KING AND THE NAVY.

VISIT TO THE FLEET.

His Majesty the King paid a visit to the Home Fleet at Weymouth in June and witnessed a series of Fleet exercises at sea. He arrived in the evening of Monday, June 20, and went on board the Royal yacht Victoria and Albert, where he gave a dinner party to many of the flag officers and captains of the fleet. The next morning he went on board the Fleet flagship Nelson, shifting his standard to her from the yacht, and led the fleet to sea. A series of Fleet exercises was carried out for his benefit.

The first minesweeping flotilla preceded the Fleet out of the anchorage, sweeping a channel for its passage. The destroyers then formed an anti-submarine screen round the battlefleet, while the cruisers steamed past to take station ahead, each catapulting her amphibian aeroplane as she passed the Nelson. The first exercise was a torpedo attack on the battleships by two flotillas, which were counter attacked by the cruisers ; 144 torpedoes were fired and at least three were adjudged to have hit the Nelson. The exercises were then interrupted for a time by fog ; the battleships passed through it in about twenty minutes, however, and as they emerged were attacked by aircraft of the Fleet Air Arm with torpedoes, bombs and machine-guns. Eighteen torpedo machines attacked, dropping torpedoes set to run under the ships, while other aircraft simulated dive-bombing and machine-gun attacks on the bridges and exposed personnel. Cruisers stationed just ahead of the Nelson then fired with anti-aircraft guns at a "Queen Bee" target, which was brought down in pieces in the fourth run from a height of some 10,000 feet.

The next item on the programme was heavy-gun firing at the wireless-controlled target ship Centurion. This could not take place, however, on account of further fog, but more exercises were done on the way back to harbour. Another "Queen Bee," simulating a torpedo attack, was fired at with close-range pom-poms and machine-guns. Depth charges were dropped by destroyers carrying out a dummy attack on a submarine, and live bombs were dropped by planes on a target towed ahead of the Nelson by a destroyer.

In the evening His Majesty gave another dinner party on board the Royal yacht, and afterwards he attended a ship's company's concert given on board the Courageous. An aircraft carrier was

chosen for that function as her hangar, empty of planes, provides room for an audience of 1,800. The orchestra was the massed bands of the Fleet; the performers, for the vocal items which formed most of the programme, 300 of the boys under training in the Ramillies together with 100 bass voices from the ship's company of the same ship. At the end of the concert the King addressed a few words of thanks and greeting to the performers and audience, and then went on board the Nelson for an At Home to the officers of the Fleet.

The next morning His Majesty landed at Portland to inspect the Anti-Submarine School and the other shore establishments there. The route of his walk up the hill was lined by detachments from all the ships of the Fleet. On his return he went on board the new escort vessel Bittern, alongside the dockyard, and inspected with interest the heavy anti-aircraft armament of six 4-inch guns and the other novel fittings with which she is equipped. After lunching in the Royal yacht he went on board various ships of the Fleet and saw their companies at harbour drills—anchor work, fire and collision stations, gas attack and de-contamination, catapulting of aircraft, and many others. Before leaving the Royal yacht at five o'clock to return to London, he made the following signal to the Commander-in-Chief of the Fleet and the Captain-in-Charge at Portland, and ordered the main brace to be spliced.

My short visit to the Home Fleet has afforded me the greatest pleasure and has also been full of interest for me.

I congratulate all ranks and ratings, both afloat and ashore, on their high standard of efficiency and on the marked progress I can see is being made in every direction.

CRUISE IN THE ROYAL YACHT.

Later in the summer Their Majesties, accompanied by the Princesses, made a short cruise in the Victoria and Albert on their way to Balmoral. They went on board on Tuesday, July 27, and after a few days in the Solent, during which they visited the Beaulieu River, Cowes and Osborne, the yacht went on to Aberdeen, anchoring at night off Deal and Southwold on the way. At the latter place His Majesty landed to visit the camp for boys in which he had taken such a close personal interest as Duke of York. The Royal Yacht anchored off Aberdeen on August 4, and the Royal party landed by barge at the docks, whence they drove to Balmoral by car.

FORTHCOMING VISIT TO CANADA.

On November 11 it was announced that Their Majesties, on their forthcoming visit to Canada, would sail in H.M.S. Repulse, escorted by two ships of the Second Cruiser Squadron.

FUNERAL OF QUEEN MAUD OF NORWAY.

Queen Maud of Norway, aunt of His Majesty the King, died in London on November 20. Her body was taken back to Norway in H.M.S. Royal Oak, in which King Haakon and the Crown Prince

Olaf also sailed. The Royal Oak, which was delayed sailing 24 hours by bad weather, left Portsmouth on November 24 and was escorted by the destroyers Keith, Bulldog, Brilliant, and Fame.

NAVAL TREATIES.

THE "ESCALATOR CLAUSE" INVOKED.

In the introductory chapter in last year's "Brassey" reference was made to the interrogatories addressed to Japan in February by Great Britain and the United States regarding the rumours that she was building ships which exceeded the qualitative limits by which the Treaty Powers were bound; and to Japan's refusal to deny or confirm those rumours. On April 1 Great Britain and America announced that, as a result of that refusal, they intended under Clause 26 of the Treaty—the "escalator clause"—to abrogate the qualitative limits for battleships hitherto operative. The French Government, which by their action was also freed from Treaty restrictions, at the same time announced that they did not intend to build battleships exceeding 35,000 tons for the present; and that that decision would only be reconsidered if some other Continental naval Power set the example.

On July 1, after the three months' consultation for which the Treaty provides, the three Powers signed a protocol defining the extent of the relaxation of treaty limits. The limit for gun calibre remained at 16 inches, but the limit for displacement was raised to 45,000 tons; but at the same time the British Government announced the intention not to exceed 40,000 tons for the present, and expressed the hope that other European naval Powers would also refrain from exceeding that figure. The necessary steps were also taken by the British Government under the various bilateral agreements with other Powers, to bring those instruments into line with the latest form of the main Treaty.

On December 2 Italy, acting in accordance with the terms of the Anglo-Italian Agreement which had just been brought into force, acceded to the 1936 London Naval Treaty. At the same time it was announced that a naval agreement with the Scandinavian Powers, in terms equivalent to the various bilateral naval agreements to which this country is already a party, was on the point of signature, which was being delayed only on account of a technical point of procedure in Denmark. The latter agreement was actually signed on December 21.

THE ANGLO-GERMAN NAVAL AGREEMENTS.

In December the German Government informed the British Government that they desired to exercise the right they possessed under the 1935 Naval Agreement* to increase their submarine tonnage above the 45 per cent. of British submarine tonnage, the limit which they had hitherto accepted. The "friendly discussion" for which the Agreement provides took place in Berlin on December 30 between Vice-Admiral A. B. Cunningham, Deputy Chief of the

* See "Brassey," 1936, p. 311.

Naval Staff, and General-Admiral Raeder, Commander-in-Chief of the German Navy; and it was later announced that the German increase would begin in 1939, and would be continued gradually until equality with British submarine tonnage was reached.

Besides the matter of submarines, notification was given of the intention to provide the 4th and 5th A-class cruisers, the right to which at any time was acknowledged by this country in the letters exchanged when the 1937 Agreement* was signed, by arming the two 10,000-ton cruisers "K" and "L" then building with 8-inch guns instead of the 6-inch hitherto intended.

The reasons assigned for these increases were no doubt disclosed in the "friendly discussion" of December 30, but they were not made public. To judge from the course of international events at the time, the move was probably prompted by political motives.

BOARD OF ADMIRALTY.

So many changes have taken place in the Board of Admiralty during the year that it has been largely reconstituted. In July Vice-Admiral Sir Alexander Ramsay, who had had much experience both as a captain and as a flag officer of the Fleet Air Arm, succeeded Rear-Admiral J. H. D. Cunningham as Fifth Sea Lord and Chief of Naval Air Services, Admiral Cunningham going to the Mediterranean as Rear-Admiral Commanding, First Cruiser Squadron.

At the end of September Admiral Sir Martin Dunbar-Nasmith left the Admiralty to become Commander-in-Chief at Plymouth, and was succeeded as Second Sea Lord by Admiral Sir Charles Little.

On September 7 Admiral of the Fleet Lord Chatfield, who had been First Sea Lord for over 5½ years, was succeeded by Admiral Sir Roger Backhouse, who had been succeeded as Commander-in-Chief Home Fleet in April by Admiral Sir Charles Forbes.

Mr. Duff Cooper resigned office as First Lord early in October, on account of his disagreement with the foreign policy of the Government. He was succeeded by Lord Stanhope whose appointment was not announced, however, for about three weeks.

In November Admiral Sir William James was relieved as Deputy Chief of the Naval Staff by Vice-Admiral A. B. Cunningham.

In December the appointment was announced of Captain H. M. Burrough to succeed Rear-Admiral L. E. Holland as Assistant Chief of the Naval Staff.

FIRST LORD'S CRUISE.

During the Parliamentary recess the First Lord, accompanied by a party of personal friends, embarked in the Admiralty yacht *Enchantress* for a cruise in the Baltic. He went on board at Portsmouth on August 3, after witnessing some of the entertainments of Navy Week in the dockyard. From Kiel, Mr. Duff Cooper paid a brief visit to Berlin, and afterwards re-embarking, visited Gdynia, Danzig—where he and his party were entertained by Herr Greiser at the Town hall—Stockholm and Copenhagen. His conversations

* See "Brassey." 1938, p. 357.

at the latter places are understood to have contributed to the conclusion, later in the year, of the Scandinavian Naval Agreement.

FLAG COMMANDS.

Vice-Admiral J. F. Somerville became Commander-in-Chief East Indies on July 24, in succession to Vice-Admiral Sir Alexander Ramsay, who had been recalled to the Admiralty. In the interval between the departure of Admiral Ramsay and the arrival of his successor, Captain Alan Poland, the senior captain on the station, was made a Commodore, 1st Class, and acted as Commander-in-Chief.

Vice-Admiral G. H. D'O. Lyon succeeded Vice-Admiral Sir Francis Tottenham as Commander-in-Chief, Africa Station, on March 8.

Rear-Admiral Geoffrey Layton became Second-in-Command, Mediterranean, and Rear-Admiral Commanding Battle Cruiser Squadron on August 23 in succession to Vice-Admiral A. B. Cunningham.

The appointment of Vice-Admiral T. Binney as Commandant of the Imperial Defence College, to succeed Air Marshal Sir Arthur Longmore on January 1, 1939, was announced in July.

On October 28 Vice-Admiral C. E. Kennedy-Purvis became President of the Royal Naval College, Greenwich, and Flag Officer Commanding Royal Naval War College, in succession to Vice-Admiral Sir Sydney Bailey, who had retired on account of ill-health.

OBITUARY.

Rear-Admiral T. F. P. Calvert died on July 1. He had been taken ill suddenly, while still in command of the 2nd Cruiser Squadron, a few weeks before.

Admiral Sir Berkeley Milne, Bart. who had been Commander-in-Chief, Mediterranean, at the outbreak of war in 1914, died on July 7, aged 83.

Sir Henry Newbolt, who succeeded Sir Julian Corbett as Official Historian of Naval Operations in the Great War, died on April 4.

Admiral Sir Lewis Bayly, Commander-in-Chief, Queenstown, for most of the war, died on May 16, aged 80. The First Lord of the Admiralty received from the Secretary of the Navy, United States, the following message on the occasion :

"On behalf of the United States Navy may I express to the Royal Navy and to Admiral Bayly's family our sincere regret and deep sympathy on his death. His high qualities of leadership and inspiration will always be remembered by those who served under the wartime Commander-in-Chief of the Western Approaches."

Miss Voysey, the late Admiral's niece and hostess of Admiralty House, Queenstown, during the war, also received the following personal telegram from President Roosevelt :

"I am deeply distressed to hear of the passing of the Admiral. The Navy of the United States will always think of him as a friend and shipmate. Mrs. Roosevelt and I extend to you our very deep sympathy."

SINGAPORE.

The Singapore Naval Base was formally inaugurated on February 14 when the Governor of the Straits Settlements, Sir Shenton Thomas, opened the great new 1,000-foot graving dock. Besides the Rulers of the Malay States, representatives from many parts of the Empire were present—India, Australia, Ceylon, North Borneo, and Hong Kong. A cruiser squadron from the United States, U.S. ships Trenton, Memphis, and Milwaukee, which had been at Sydney for the sesqui-centennial celebrations there earlier in the year, was visiting the Colony, and sent representatives to the ceremony. The Admiralty were represented by Colonel J. J. Llewellyn, the Civil Lord, the East Indies Squadron by the Commander-in-Chief, Vice-Admiral Sir Alexander Ramsay, and the China Fleet by Vice-Admiral L. G. E. Crabbe, who had been Acting Commander-in-Chief up to the arrival of Sir Percy Noble.

The Governor's yacht Seabelle entered the graving dock and secured alongside, accompanied by the destroyers Duncan and Diamond and auxiliary vessels manned by the Straits Settlements R.N.V.R. The Governor then landed, and at the request of Colonel Llewellyn formally named the dock King George VI dock. The Civil Lord, in a speech of welcome to the assembled guests, emphasised that the development of the Naval Base was a force making for peace in the world, and paid tributes to the designers, the contractors, Sir John Jackson & Co., and to all who had been concerned in the transformation of virgin swamp and jungle into the magnificently equipped installation just completed. The proceedings concluded with a reception by the Civil Lord on behalf of the Admiralty, given on board H.M.S. Eagle.

This ceremony marked the conclusion of 16 years' work. The decision to establish a base capable of serving a modern fleet was taken in 1921. The project was warmly supported by the Dominions; New Zealand contributed £1,000,000 to the cost, Hong Kong £250,000, the Federated Malay States £2,000,000, and the Straits Settlements acquired and presented the site, which was selected in 1922. Work was started the following year but was suspended in 1924 under Mr. Ramsay MacDonald's first Government. The suspension of the work caused the cancellation of Australia's intended contribution towards the cost, and the diversion of the money to a programme of naval construction as the Commonwealth's contribution to Imperial Defence. Work was restarted in 1925, but a further check occurred in 1929 under the second Socialist Government, when work was slowed down as much as possible and a "truncated scheme" adopted under which the completion of the dockyard and defence works, apart from current contracts, was deferred for five years. That decision was again reversed on the formation of the National Government and in 1937 certain additional works were approved which would increase the capacity of the base by some 50 per cent.

In 1921 a Captain-in-charge was appointed to Singapore to supervise the naval establishments which were gradually created as the accommodation for them came into being. In 1934 the officer

in charge became a Commodore, 2nd Class. In 1937 the title of the appointment became "Commodore, Malaya," and in August, 1938, the status of the appointment was raised to that of a Commodore, 1st Class. Captain T. B. Drew was appointed in that rank on September 9.

REDISTRIBUTION OF SHIPS.

It was announced in August that the two battle cruisers *Repulse* and *Hood*, on the completion of their next refits—which take place in home dockyards—would join the Home Fleet, their place in the Mediterranean being taken by the battleships *Royal Oak* and *Ramillies*. The *Repulse* arrived home in September, and the *Hood* was due to return in January. On the departure of the latter, Vice-Admiral Sir Geoffrey Layton would cease to command the Battle Cruiser Squadron, but would remain Second-in-Command, Mediterranean Fleet, with his flag in one of the battleships. The appointment of Rear-Admiral, First Battle Squadron, would then lapse.

The cruisers *Emerald* and *Enterprise* which for many years past have served continuously on the East Indies Station, were withdrawn during the year and later replaced by the new cruisers *Manchester* and *Liverpool*. The *Gloucester*, of the same Class, which ran her trials in November, was under orders to relieve the flagship *Norfolk* on the same station early in the New Year.

The *Birmingham*, also of the "Southampton" class, joined the China Fleet, replacing one of the 8-inch-gun cruisers, in February.

The new aircraft-carrier *Ark Royal*, on delivery in November, became flagship of the Rear-Admiral Commanding Aircraft-Carriers, replacing the *Courageous*, which in turn took over from the *Furious* the duty of training pilots of the Fleet Air Arm in deck landing.

The first eight of the "Tribal" class of destroyers were delivered during the year, and joined the Mediterranean Fleet.

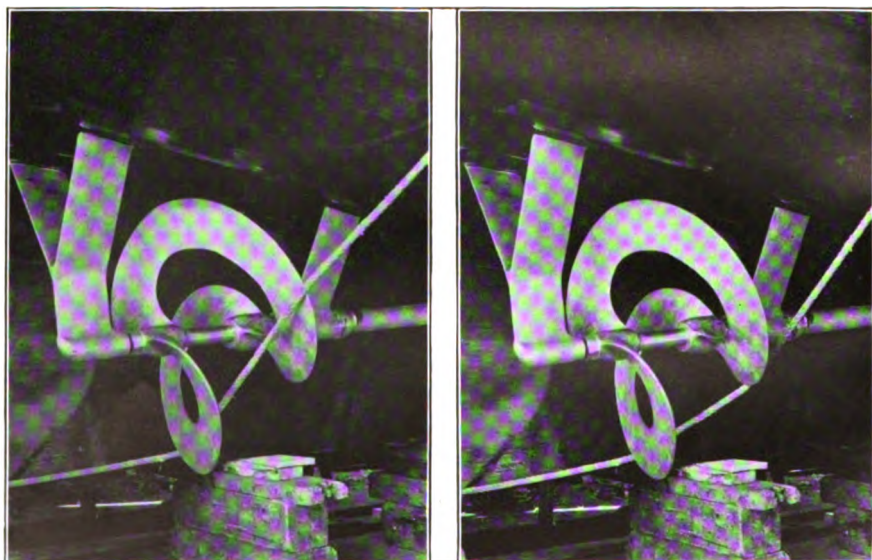
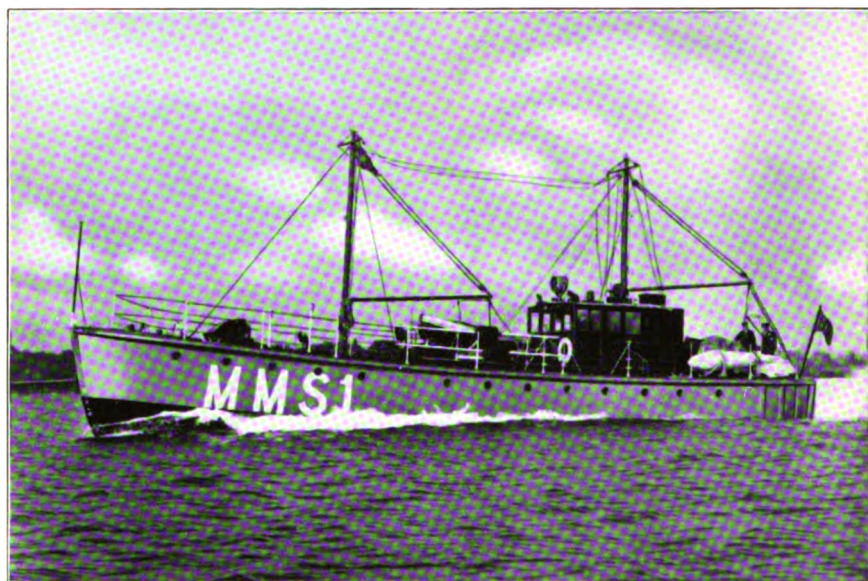
The Second Motor Torpedo Boat Flotilla of six boats was sent to Hong Kong in the autumn.

LOCAL ASSOCIATIONS OF H.M. SHIPS.

Several new ships coming into service which are named after cities have been the recipients of trophies and presentations from the civic authorities of their sponsor cities. In January the Lord Mayor of Birmingham, accompanied by some 400 citizens, visited H.M.S. *Birmingham* at Portsmouth before her departure for the China Station and presented a ceremonial drum, 4 side drums, six silver bugles, a silk ensign, besides a number of other silver articles from the inhabitants and various associations in the city.

In March H.M.S. *Belfast* was launched from the Belfast yard of Messrs. Harland and Wolff by Mrs. Chamberlain, the wife of the Prime Minister.

In September the Lord Mayor of Manchester and other civic dignitaries visited H.M.S. *Manchester* at Portsmouth before her departure for the East Indies, and made presentations to her similar to those of Birmingham. It seems to have been a point of honour



1. H.M. MOTOR MINESWEEPER M.M.S.1.
2. THE UNFOULABLE PROPELLER.

(By courtesy of the builders, Messrs. John I. Thornycroft & Co.)

amongst Mancunians that they should outdo their brothers of Birmingham in this respect. The Manchester Regiment a few days later presented the ship with a silver bugle.

In January, 1939, H.M.S. Liverpool visited the city before leaving for the East Indies and spent three days in the Gladstone Dock. She already possessed the silver bell and silver plate presented by the city to the fourth H.M.S. Liverpool in 1912, and to these were now added silver cups, candlesticks and bugles, and a silken ensign. The presentation was made by the Lord Mayor with much ceremony and civic entertainments.

In November H.M.S. Gurkha, destroyer of the "Tribal" flotilla, was presented with trophies from each of the ten Regiments of the Gurkha Brigade.

MOTOR TORPEDO BOATS.

A second flotilla of six 60-foot motor torpedo boats is now in service on a foreign station, having been despatched to Hong Kong in the autumn. The first flotilla has been for over a year in the Mediterranean.

Orders for twelve more craft of this class were placed in August, four from Messrs. Vosper, two from Messrs. Thornycroft, and six from the British Power Boat Company. Of the last-named, two were experimental boats.

Two motor minesweepers, built by Messrs. Thornycroft, have been in service during most of the year, and have given very satisfactory results. A notable feature of these boats is a special non-foulable propeller—a great asset to a minesweeper, since it is practically impossible for it to catch and foul a rope or mooring coming into contact with it. It is rather less efficient than a propeller of the usual form for a motor-boat, but not very much so.

The limiting factor in advance in motor torpedo boat design hitherto has been the engine. Given a satisfactory marine engine with a power/weight ratio comparable to that of aero-engines, a satisfactory motor torpedo boat follows easily. Towards the end of the year the British Power Boat Company, in association with Rolls-Royce, produced the 1,000-horsepower "Merlin" marine petrol engine, and built a 70-foot boat embodying three of them. This boat is large enough to carry two 21-inch or four 18-inch torpedoes, besides depth charges and A.A. armament, while still attaining a satisfactory speed. The design has been adopted by the Royal Netherlands Navy, which has ordered one boat from the British Power Boat Company and will build 19 more under licence. Two have been ordered for Sweden. A similar boat is to be submitted to the Admiralty for trials.

Ratings serving in motor torpedo boats in commission are paid "hard-lying money" at half rates. Men for service in them are selected, as far as possible, from those volunteering for them; there has been no lack of volunteers.

SPANISH WATERS.

There was not so much for the British Navy to do in Spanish waters during 1938 as there had been in the preceding year. The Nyon patrols were, of course, continued but as there was no recrudescence of the submarine attacks which had caused their establishment, they appear to have been reduced in strength. On January 31 the small Gibraltar steamer *Endymion* was sunk by explosion just after dawn when approaching Cartagena. She was believed at first to have been torpedoed by a submarine, but later investigation disclosed no evidence supporting that supposition, and it was concluded that a drifting mine was the probable cause of the loss.

Four days later the British steamer *Alcira*, when on the Nyon route and flying the non-intervention flag, was sunk by bombs from a seaplane bearing the marks of the Nationalist forces. A sharp protest to the Nationalist Government produced an apology, and no more British ships were made the target for such attacks on the high seas ; but ships of other nationalities, whose Governments were not in a position to resist high-handed action at sea, continued to be molested.

On July 23 H.M.S. *Shropshire*, when on passage to Marseilles, witnessed the sinking by bombs from the air of the Danish S.S. *Bodil*, 60 miles east of Barcelona. She was not near enough to engage the attacking plane, but picked up the boats containing the *Bodil's* company. Numerous British merchant vessels, too, were damaged, and several sunk, while lying in Republican ports which were being attacked by Nationalist air forces. In some cases the damage was merely incidental, in that the ships happened to be lying not far from the objective of the attacks ; but in others the attacks were obviously made directly on the ships themselves. Protests were made, but obviously no retaliatory action could be taken in such circumstances except by intervention in the civil war which, for this country, was ruled out.

On March 6 H.M. Ships *Kempfenfelt* and *Boreas* were instrumental in saving many lives off Cartagena. At 2 a.m. on that day, when the Nationalist cruisers *Baleares*, *Canarias* and *Almirante Cervera* were in the vicinity, they were attacked by the Republican cruisers *Libertad*, *Cervantes*, and the 2nd Destroyer Flotilla. The latter fired nine torpedoes and the *Baleares* was hit and sank shortly afterwards. The other two Nationalist cruisers appear to have steamed on, possibly still engaged with the Republicans, but the *Kempfenfelt* and *Boreas* arrived before the *Baleares* sank and picked up 38 officers and 328 men. The difficulties of rescue were much increased by the oil fuel on the water from the damaged ship ; but for that, more could probably have been saved.

After the action, the Republican forces, which were stated to have been undamaged, returned to Cartagena. At daybreak the *Canarias* and *Almirante Cervera* returned to the scene, and many of the survivors were transferred to them from the British ships. While the transfer was taking place, Republican planes arrived and dropped bombs, splinters from which killed one of the *Boreas's* men and

wounded three others. The transfer was then suspended, and the *Kempenfelt* landed the remainder of the survivors at Palma.

The action of the Senior Officer in this respect was afterwards criticised by the Opposition in Parliament, by whom it was suggested that the men rescued should have been interned. Actually, it is well established that men rescued by neutrals from a man-of-war sunk in action are entitled under international law to be treated as any other ship-wrecked mariners and to be repatriated, not interned. The action of the British senior officer in this case was therefore strictly correct.

Another difficult problem in international law was later presented to the British authorities at Gibraltar, by the career of the Republican destroyer *Jose Luis Diez*. This ship, the year before, had spent some time in Falmouth harbour, after which she was for some months in a French port being repaired. In August she attempted to reach a Republican port, but was located and engaged in the Straits of Gibraltar by Nationalist forces on the night of August 26. The following morning she took refuge in Gibraltar with 25 of her crew killed, 10 wounded, and a large hole in her bow. She was allowed to remain while the damage was repaired, and one delay after another lengthened her stay into months, during which the Nationalist ships maintained a patrol to watch for her just outside territorial waters. Her repairs were finally completed in December and she made another attempt to get home in the small hours of December 30.

She was, however, detected and engaged by the Nationalist forces as she cleared the Bay. She was hit once, by a shell which killed four and wounded ten of her crew, and she then ran herself ashore in Catalan Bay. Two shells from her assailants hit the shore at Catalan Bay, wounding a policeman and two villagers. The crew of the *Jose Luis Diez* were then taken off by the British naval authorities, who took charge of the ship herself, towed her into the dockyard where she still remains. Her crew were conveyed to Republican Spain by British man-of-war.

Thus ended an inglorious career. The *Jose Luis Diez* is a modern, fast, well-armed destroyer, and if handled with only a moderate degree of efficiency and determination—such as seemed to be indicated by her achievement in getting as far as Gibraltar—should have been able at least to make a good fight of it, if not, on a dark night, to succeed in getting through to Cartagena. Indeed, if it was important to the Republican cause that she should succeed, some sort of diversion by other forces from Cartagena might have been expected. Yet it required no more than one hit to induce her commander to abandon his enterprise and run his ship ashore on a neutral coast. If that was the best service to their cause of which her company were capable, they might more safely and just as usefully have scuttled their ship in Gibraltar Bay instead of steaming out of it.

BRITISH MISSION TO PORTUGAL.

A British Services Mission spent a large part of the year in Portugal. The head of it was Rear-Admiral N. A. Wodehouse, the

other principal members Group Captain R. N. Field and Colonel T. D. Daly ; they arrived in Lisbon on February 20. After inspections and contacts with the Portuguese Defence Services, the Mission finally left in December. As one result of the Mission's work, a British naval officer, Engineer Rear-Admiral R. C. Hugill, has been appointed for two years as technical adviser to the new arsenal at Alfeite on the south bank of the Tagus ; he retired from the British service in order to take up the appointment.

HOME FLEET VISIT TO LISBON.

A part of the Home Fleet, under the Commander-in-Chief, Admiral Sir Roger Backhouse, visited the Tagus from February 1 to 4. They were given a warm welcome and the President, General Carmona, visited the fleet flagship Nelson. There were receptions and entertainments on both sides which were greatly appreciated in Portugal. Later the Ramillies and Rodney in succession visited Madeira, where they were welcomed by a detachment of the Portuguese Navy ; and the Lucia and Second Submarine Flotilla visited Lisbon for a week during which many Portuguese submarine officers were shown over and taken for cruises in British submarines.

MISCELLANEOUS SERVICES PERFORMED BY H.M. SHIPS.

In March H.M.S. Milford, escort vessel, while returning to the Africa Station after recommissioning at home, called at Tristan da Cunha and stayed for two days.

On March 5 the French steamer Yolande went ashore on the Shantung Promontory, North China. The cruiser Capetown, sent to her assistance, put a party ashore four miles away, who made their way to the cliff abreast the ship, rigged an improvised breeches buoy and rescued the captain and his daughter, four other Europeans, and fifty-four Chinese. Four of the Chinese crew had already got ashore and nine were missing. Shortly afterwards the Yolande broke up completely.

On May 5 the British S.S. Thurland Castle ran ashore on Tamkan Island, fifteen miles to the south of Hong Kong. H.M.S. Defender was sent to her assistance, and although the ship was pounding heavily, brought off seven European passengers. The crew remained on board in order to save the ship when the weather moderated.

Admiral Sir Dudley Pound, Commander-in-Chief, Mediterranean, with a party of over 200 seamen, marines and band, attended the funeral of Kemal Atatürk, President of Turkey, at Ankara in November.

EXERCISES.

SINGAPORE.

The customary Combined Exercises took place at Singapore early in February, before the formal opening of the Naval Base. The attacking force consisted chiefly of units of the China Fleet, but it was reinforced by two cruisers from the East Indies and three

sloops of the Indian Navy ; and it was under the Commander-in-Chief, East Indies, Vice-Admiral Sir Alexander Ramsay, in the absence of the new Commander-in-Chief, China, Sir Percy Noble, who had just taken over his new command and was in the north of his station. The defence, under Major-General W. G. S. Dobbie, G.O.C., Malaya, disposed of 10,000 troops and 100 planes, the normal air garrison having been reinforced from India and Irak. The Straits Settlements R.N. Volunteer Reserve was embodied for the period of the exercise and its auxiliary craft were employed on look-out duties.

The defences were manned from sunset on February 2. During the night four destroyers were detected by the R.N.V.R. patrols and were engaged by the shore batteries. Soon after daylight an air patrol reported the enemy aircraft carrier 200 miles away and a force of bombers was despatched to attack her. At the same time her aircraft delivered an attack on the air base but as the defence had received adequate warning, the damage inflicted was adjudged insufficient to hamper the working of the defence.

The following night a submarine on patrol reported a cruiser off Johore at 1.30 a.m. Aircraft were sent out to search the coasts, but were unable to locate the enemy despite the use of powerful parachute flares. In the afternoon of the next day scouting aircraft reported a large naval force 100 miles away, but lost touch with it in heavy rain, which lasted until nightfall ; nor could touch be regained. A " black-out " on the last night of the exercise was part of the practice and was reported to be most successful.

The lesson of the exercises was understood to have been that the air defences need strengthening. In consequence, the two new squadrons presented by the Sultans of the Malay States are to be reinforced by others.

COMBINED FLEET EXERCISES.

The exercises of the combined Home and Mediterranean Fleets took place in the Atlantic west of Gibraltar between March 8 and 18. The first part consisted of tactical exercises only, of which no report is made public. After spending the intermediate week-end at Gibraltar, a brief strategical exercise lasting some 48 hours was carried out.

In order to remove the manœuvre area well to the westward of Spanish waters, the Iberian Peninsular was supposed to be extended about 400 miles to the westward in the latitude of Gibraltar, i.e. to longitude 13° W., and thence north along that meridian. This left a passage 300 miles wide between the imaginary land and Maderia, which itself constituted the north-east corner of " Redland." " Blue-land " was the Azores ; mainland, real and imaginary, on either side of the Straits of Gibraltar was neutral.

The Red Fleet, consisting of 5 battleships, 7 cruisers, 1 aircraft-carrier, and 4 destroyer flotillas, based on Maderia and Teneriffe, was given the task of protecting trade in the approaches to the Straits of Gibraltar against the attacks of Blue, whose forces com-

prised 2 battle cruisers, 4 cruisers, 1 aircraft-carrier, and 7 submarines. Lord Chatfield, First Sea Lord of the Admiralty, witnessed the exercises as the guest of the Commander-in-Chief, Home Fleet.

AIR EXERCISE IN THE CHANNEL.

Advantage was taken of the Home Fleet's passage home from Gibraltar to provide targets for air and submarine forces based at home. The battleships of the Home Fleet represented a convoy of troopships coming from the Mediterranean and bound for the eastern Channel ports. The time they left Gibraltar was communicated to the defending forces, and they were confined to a channel 80 miles wide for their passage across the Bay of Biscay.

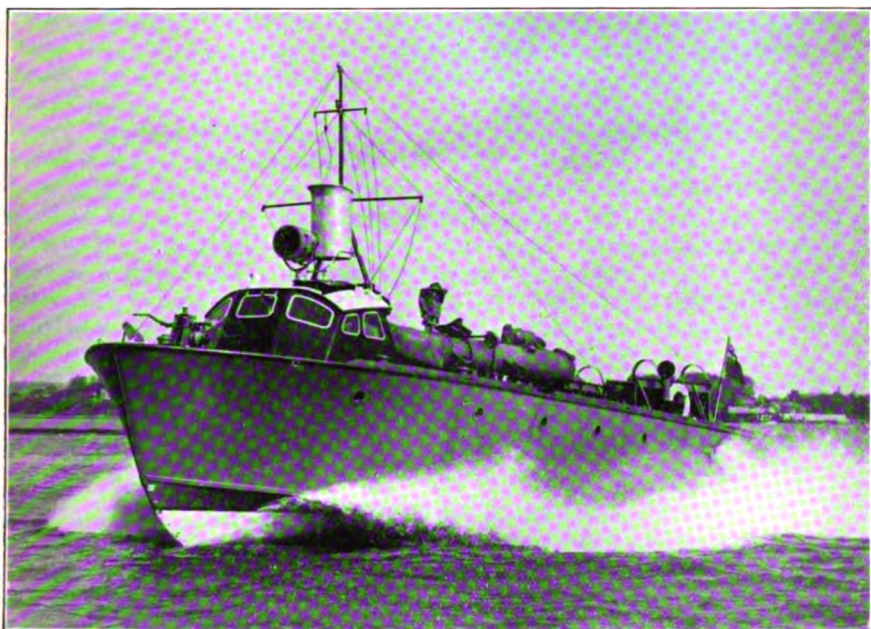
The Home Fleet, known as Red, passed the latitude of Finisterre and entered the exercise area at 8 p.m. on Sunday, March 27. Flying boats on the Blue side located the Fleet at 7 a.m. on Monday and kept it under observation throughout the day, though they lost touch at night when the ships were darkened. Red's aircraft were employed solely on anti-submarine patrol for the fleet, so there were no air fights ; but some doubt was expressed on the Red side whether the Blue flying boats could actually have observed the fleet so closely as they did without being shot down, and consequently, whether they could really have kept touch in war conditions in the weather that prevailed. Both surface and aircraft on the Red side claimed to have sunk Blue submarines which approached the fleet on Monday.

At 7 a.m. on Tuesday the fleet crossed the line Falmouth-Ushant, and thereafter was repeatedly attacked by shore-based bombers and torpedo-bombers. It had been intended that the motor torpedo boats from Portsmouth should also attack the fleet, but the reconnaissance air patrols which were to have directed them to their quarry had been withdrawn by the time the fleet came within their range, and the attack did not take place.

The exercise had no strategical significance, for no initiative in the matter of movements was allowed to Red. It was designed solely to provide targets for both sea and air forces. Unfortunately one of the flying boats of No. 228 Squadron was lost off Brest on Monday, and two officers, three airmen, and one press representative were killed.

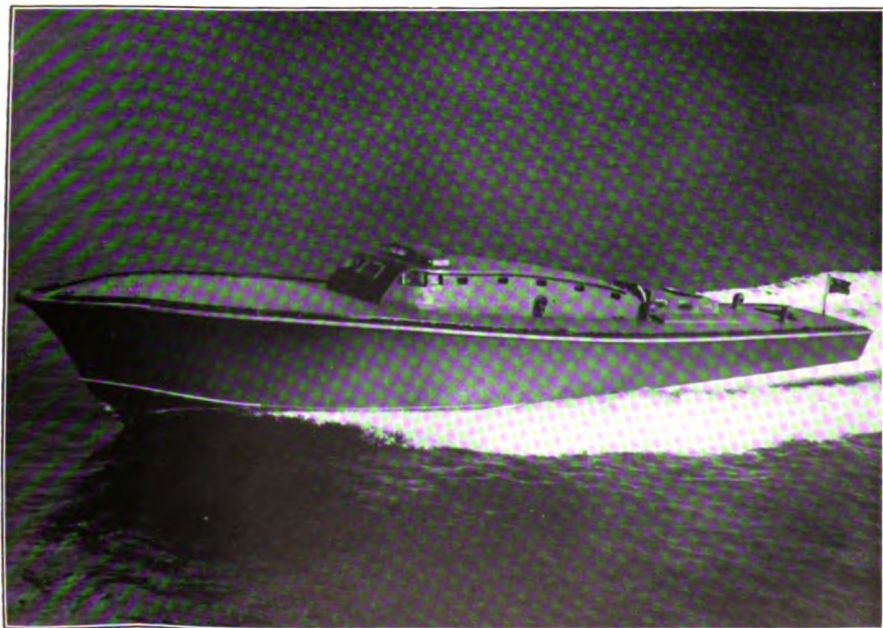
LANDING EXERCISE IN START BAY.

In July a Combined Operation was carried out in the West Country. The 9th Infantry Brigade embarked at Portsmouth in the transport Lancashire and their mechanical transport in the Clan Macalister. The transports sailed from Spithead on Monday evening, July 4, escorted by the cruisers Southampton and Sheffield, the battleship Revenge, destroyers and minesweepers. The whole of Tuesday it blew fresh from the south-west, and the military part of the attacking force, cruising in the Channel well out of sight of land, were one and all seasick. There appeared very little chance of a landing being effected within the time available ; but the weather moderated at night, and a shift of wind made the beach in Start Bay



TORPEDO-DEPOT TENDER ELCOCHUND.

(By courtesy of the builders, Messrs. Vosper, Ltd.)



70-FOOT MOTOR TORPEDO BOAT AT SPEED

Boats of this design have been ordered by the Swedish and Netherlands Governments.

(By courtesy of the builders, The British Power Boat Co., Ltd.)

practicable. In the small hours of Wednesday, the advance parties of the infantry landed in ships' boats from the men-of-war, and were able to seize a covering position before they could be hindered by the defenders.

The fine weather held throughout the day, and the whole of the mechanical transport was got ashore by 4 p.m., while the men-of-war steamed up and down in the offing to protect themselves from submarines and the transports from attack. The "motor landing craft"—a sort of self-propelled horse-boat—were found to be very satisfactory, and it proved possible to land motor vehicles direct on to the shingle beach, and run them out of the boats and up "beach roadways" under their own power. Once the whole force was ashore, the Army went home by road, leaving the Navy to recover its boats and beach gear, and generally to clear up. As the weather turned bad again that evening, the task was unpleasant, and a good deal of gear was lost; but there were no casualties except to boats.

COAST DEFENCE EXERCISES.

A combined Coast Defence Exercise, designed chiefly to give practice to certain coast defences and to test the machinery of co-ordination between the three Services in that sphere of their activities, took place on the return of the Home Fleet from a Scandinavian cruise in July. The bulk of the Home Fleet formed the attacking force—Blue—at a strength of 4 battleships, 4 cruisers, 11 destroyers, 5 submarines, and 5 squadrons of ship-borne aircraft. On the Red—defending—side, the coast fortresses were manned by the Territorial Army; the Red Fleet, supposed to be of strength equal to Blue, was represented by 2 cruisers and 4 destroyers. The Red Air Force consisted of 8 General Reconnaissance Squadrons—3 of flying boats and 5 of Anson landplanes—1 torpedo-bomber Squadron, 4 fighter Squadrons and 6 aircraft for coast artillery co-operation.

At 8 p.m. on Tuesday, July 19, Red was informed that Blue was believed to have put to sea; at midnight war was declared. Red air patrols were established by 8.30 a.m. on Wednesday, but weather was unfavourable for reconnaissance. However, they located a Blue cruiser soon after 7 a.m., north-east of the Orkneys; and at the same time merchant ships were attacked by Blue submarines off the Yorkshire coast. Between 5 and 6 a.m. Blue aircraft attacked Rosyth, Montrose, Leuchars, and Thornaby; at 6.30 a.m. local naval patrols located a Blue submarine off the Tyne. Red air units were sent to search for and attack the submarines, but no engagements were reported.

In the meanwhile, the Red air patrols had succeeded in locating the Blue battlefleet, 150 miles east of the Tyne, at 2 p.m., and kept in touch with it throughout the day. As a result the Red fleet was able to bring it to action at 7.45 p.m. the same day; but the remainder of the Blue forces, 2 cruisers and 3 destroyers, were only located at 8.20 p.m., well to the southward, 75 miles east of Lowestoft. This latter force was brought to action by a superior Red force at 1 a.m.;

while the Blue cruiser off the Orkneys, the first enemy to be located, had been brought to action at 1.30 p.m. in the afternoon.

The naval part of the exercise was thus completed, and the great assistance which shore-based aircraft could bring to a defending naval force was fully demonstrated. The exercise was therefore stopped, and recommenced, with the object of giving the air forces further experience and practice in locating naval forces at sea, and in giving practice to the coast fortifications. The second phase proved to be very interesting, despite the fact that Blue forces were no longer acting as they would have done in war, but deliberately engaged all the shore batteries which were manned; for the weather changed, and for some 24 hours air reconnaissance became impossible. It cleared up again later, however, and the air patrols were able once more to keep continuous touch with the fleets at sea. This exercise afforded most useful practice to all three Services.

ROSYTH DOCKYARD.

The dockyard at Rosyth has been on a "care and maintenance" basis ever since the war. The expansion of the Fleet, and the reconstruction of a number of older men-of-war has thrown an increasing strain on the resources of the southern yards. It has, therefore, been decided partially to re-equip Rosyth dockyard sufficiently to make it capable of undertaking the refit of a cruiser and some destroyers at a time.

NAVY WEEK.

Navy Week was again an outstanding success, the total number of visitors in 1938 being 415,560, an increase of 17,905 over the previous year. In order to advertise the attractions to the inhabitants of London, advance exhibitions were arranged on a small scale, one in June in a large London shop and one in July in the hall of the Charing Cross Underground station. To some it appeared rather *infra dig.* that the Royal Navy should allow itself to appear as one of the attractions secured by a retail establishment in London in order to induce the public to enter its shop. Navy Week proper took place at the three dockyards during the first week in August—being the yard holiday. In London, H.M.S. President, headquarters of the London Division, R.N.V.R., was open to the public for the week August 24 to September 4, when the London Division staged a Navy Week of its own, which was opened by the Lord Mayor.

PERSONNEL.

OFFICERS.

The long-delayed grant of Marriage Allowance to naval officers was announced in the House of Commons on March 17 by the Parliamentary Secretary to the Admiralty, in the absence of the First Lord through illness, in his speech introducing the Estimates. Marriage allowance would in future be payable from the age of 30—for Warrant Officers 25—to all officers up to and including Captains R.N. and Colonel R.M. At the same time the pay of all

officers of the rank of Lieutenant-Commander and above would be cut by 2s. a day, to operate at the next promotion in order that no officer should actually lose money by the change.

The rate of marriage allowance would be 5s. 6d. a day for Captains, 4s. 6d. a day for all other ranks; children's allowance 2s. a day for the first child, 1s. for each subsequent child. Marriage allowance would take the place of "lodging allowance," hitherto payable to officers in shore appointments who were not provided with Service accommodation; it would therefore not be payable to officers provided with married quarters, who would receive children's allowance only. But officers in shore appointments abroad who were unable, or unwilling for adequate family reasons, such as children's education, to take their families with them, would receive marriage allowance even though provided with quarters or in receipt of lodging allowance.

It was at first proposed to abolish the privilege of free or assisted passages for the families of officers sent to shore appointments abroad. The hardships which this proposal would entail was, however, quickly recognised, and it was abandoned within a month of being promulgated. All officers sent to shore appointments abroad will now be allowed free passages for their families, if they elect to take them with them.

The grant of marriage allowance was welcomed throughout the Navy with gratitude, tempered with resignation regarding certain disabilities which still survived. The first was that it was to be payable only to officers on full pay. This was of no great moment to those below the rank of Captain, who were eligible for "unemployed pay" at full-pay rates between appointments; but it was a serious matter to Captains, who were normally placed on half-pay whenever unemployed, just at the period when, as a rule, their family expenses in respect of children's education were at their heaviest. This practice, in the words of an Admiralty announcement, "has in the past borne heavily upon officers"; and it has now at last been discontinued.

At the end of July, the "pay and emoluments" of officers of the three Services reviewed, with the intention of bringing them more into line with one another. Automatic promotion up to the rank of Major was introduced into the Army, thus putting junior Army officers on the same footing as naval officers, for whom promotion up to the rank of lieutenant-commander had long been automatic. The Army reforms also included the abolition of half-pay for colonels and above, and the Navy was brought into line in that respect. In future, captains and flag officers unemployed other than at their own request, are to be entitled, like officers of lower ranks, to unemployed pay at full-pay rates. Flag officers are in future to be retired as soon as the Board decide for certain that they will not be employed again, instead of, as at present, being allowed to await their next promotion. When these provisions come fully into force, the rates of retired pay for flag officers are to be assimilated to those of the other Services—involving a substantial increase on present rates, i.e. Rear-Admiral £950, Vice-Admiral £1,120, Admiral £1,300.

The second of the disabilities mentioned above still remains ; it lies in the actual rates of marriage allowance. Presumably the purpose with which marriage allowance is granted is to enable the officer without private means to marry and bring up a family while, without the least extravagance, maintaining the position expected of him. It is common knowledge that that is not possible to-day, even with the marriage allowance now granted. It will probably be generally agreed that for unmarried officers, the present rates are quite adequate. But what is needed is a new investigation into the actual expenses incurred by married officers, in all three Services, in the conditions in which the nature of their Service compels them to live, taking into consideration the actual allowances drawn by each, and the fact that, for instance, Army and Air Force officers are entitled to free medical attendance for their families and free passages for them when serving abroad, whereas naval officers are not. On the basis of such an investigation, it would be possible to fix marriage allowance at a figure which will fulfil its real purpose. Until this is done, naval officers will be left with a justifiable sense of grievance, and the practical effect will be to confine the officer ranks to those possessed of private means. The latter is not in accordance with the policy of successive Governments, nor indeed is it a practicable policy for to-day.

INCREMENT OF PAY FOR COMMANDERS.

Officers of Commander's rank in all branches were granted in July an additional increment of pay at 12 years seniority, similar to those hitherto operative at 3, 6, and 9 years seniority.

ABOLITION OF THE SUPPLEMENTARY LIST.

It was announced on March 30 that officers transferred to the Navy from the Royal Naval Reserve would no longer be borne on a Supplementary List, but that their names would appear on the ordinary lists. The differential rates of pay, allowances or pension thus presumably disappear, and the officers concerned will be eligible for promotion on their merits, as are those entered in the ordinary way. They are still, however, eligible for specialisation only in Submarines, Fleet Air Arm, Anti-submarine, Physical Training, and Hydrographical Surveying.

RANK AND COMMAND OF RETIRED OFFICERS CALLED UP FOR SERVICE.

A Fleet Order issued in October made a change in the rules which have hitherto governed the status of retired officers called up for service in war or emergency. The King's Regulations used to provide that retired officers who had received promotion on the retired list were entitled to use the title and wear the uniform of the higher rank ; but that the right of command amongst naval officers would be governed by their rank last held on the active list.

Under this rule it might happen, for instance, that an officer wearing the uniform of a captain and addressed by that title would actually be under the orders of a commander on the active list. It was considered that this would cause confusion and inconvenience ; and it was therefore enacted that in future, though retired officers will still have the right to the uniform and title of the higher rank while retired, when called up for service they will wear the uniform of the rank last held on the active list, unless specially appointed in the higher rank. The anomaly would in any case cease in the not far distant future, since officers are now no longer promoted after retirement ; and those who now hold a rank higher than that in which they last served will in due course pass out of the age for re-employment.

CADETS' TRAINING.

The period of sea-going training for cadets from the Royal Naval College at Dartmouth was reduced in 1936 from two terms to one in order to accelerate the supply of officers. Presumably the shorter period has been found insufficient, and the two-term period was re-introduced from May. Cadets entered direct from public schools do three terms in the training cruiser.

SAILING FOR NAVAL OFFICERS.

In order to encourage proficiency in boat sailing and racing amongst naval officers, and to encourage the valuable work done in that sphere by the Royal Naval Sailing Association the Admiralty have purchased six 14-foot racing dinghies for loan to officers at Portsmouth. The boats are kept hoisted on the sea-wall of H.M.S. Vernon, and are available for any naval officer at a nominal charge. They are Class boats of the Solent Racing Association and races for them are arranged at all Solent regattas. There are also races for them at Spithead every Wednesday and Thursday throughout the season.

UNIFORM.

The frock coat was re-introduced for Marine officers early in the year, thus once more providing the Marine officer with a semi-ceremonial dress more in harmony with his surroundings in the wardroom when embarked than has been available of recent years. At the same time Marine officers were authorised to use a boat-cloak, if they so desired, similar to that worn by naval officers but, in order to mark the military status of the wearers, lined with crimson silk—a picturesque if flamboyant variation.

A new tropical uniform has been approved for naval officers, consisting of a white twill shirt with two breast pockets and shoulder straps of rank, white drill shorts, and either blue stockings with laced boots for use ashore, or white stockings with white shoes on board.

Various small changes in men's kit were introduced during the year, chiefly in response to requests received during the " Review of Service Conditions."

MEN.

RATES OF PAY AND MARRIAGE ALLOWANCE.

In March it was announced that the differences between pay of men on ordinary continuous service engagements and those on "Special Service" engagements—i.e. for periods shorter than twelve years followed by a period in the Fleet Reserve—would be abolished. They had always been anomalous, since two men of the same age, the same rate, the same seniority and doing the same duties might be drawing different rates of pay. From April 1, all men are paid at the rates applicable to those on continuous service.

At the same time, new rates for marriage allowance having been introduced into the Army as a part of the effort of the Secretary of State for War, Mr. Hore-Belisha, to improve recruiting, the Navy and Air Force were brought into line. The differential rates of marriage allowance, varying between 7s. and 10s. weekly, have all been replaced by a flat rate of 17s., children's allowances remaining as before. In addition, a widower receives a special allowance of 12s. a week as long as he maintains a home for his children.

DRAFTING.

A new system of drafting was introduced in July. The system hitherto in force had not worked altogether fairly in certain cases. The method of keeping the rosters, which was based on sea service, home and foreign, as against shore service, occasionally resulted in some men having an undue share of foreign service. In future rosters for foreign service will be based on the date of last return from abroad; home service will be divided into home sea service and port service. The new system should meet grievances which in the past have been not without justification.

RESERVE FLEET SUPPLEMENTARY PARTY.

In order to free active service ratings, hitherto forming the nucleus crews of ships of the Reserve Fleet, for service in the active Fleet, a "Reserve Fleet Supplementary Party" has been created. It consists of ex-Naval ratings, pensioners and others with not less than four years' service to their credit, under the age of 55. They join up for service up to March, 1942, in the Reserve Fleet only, and they form the complements of the ships in every respect. Pensioners continue to draw their pensions in addition to the pay of the rate in which they have rejoined—which may be, and often is, lower than that which they last held in active service—but they earn no increase of pension by their "Supplementary Party" service.

Similar men have been recruited, under very much the same conditions, for service with controlled minefields and similar defence equipment.

NEW GUNNERY RATINGS.

The increasing complexity of the gunnery equipment of to-day, and the wide differences between the duties and qualities required of men in different gunnery jobs, have led to increased specialisation

for gunnery ratings. Formerly every gunnery rating took the whole world of gunnery as his province, and was expected to be equally expert in loading or laying a turret or a small anti-aircraft gun, working a rangefinder, or a calculating instrument in the control installation. In future, he will join one of four branches; the "Quarters Section" will load and work the guns themselves—except close-range anti-aircraft guns. The "Layer Section" will lay and train guns, turrets, and directors. The "Control Section" will work all rangefinders and control instruments, whether for communication or calculation. The "A.A. Section" will provide A.A. look-outs, A.A. control personnel, and will work the close-range A.A. weapons.

This specialisation, particularly in control duties, should make it possible for ratings to reach a standard of proficiency in that respect far superior to present possibilities. It should thus enable them to perform many duties which it is now necessary to allot to officers.

REVIEW OF SERVICE CONDITIONS.

The Admiralty decisions upon a number of the requests submitted by the lower deck representatives under the "Review of Service Conditions" were promulgated during the year.

COMMISSIONS FROM THE LOWER DECK.

Of the 31 Acting Petty Officers, lower deck candidates for commissions, who had been under special training in H.M.S. Ramillies for nine months, 17 were promoted to Sub-lieutenant on August 24. The number was found in some quarters to be disappointing. It had been stated in Parliament in answer to a question on July 27 that all 31 candidates had passed in seamanship; but that, although only 23 of them had reached the educational standard laid down, all 31 would go before the final selection board, which would consider each man on his individual merits. This was taken by some as an intimation that the number to be promoted might be greater than the 23 mentioned; but there would seem to have been no grounds for that assumption.

The next batch of candidates, whose number had not been made public, are being trained in H.M.S. Resolution, as H.M.S. Ramillies is being transferred to the Mediterranean Fleet.

Seven Engine Room Artificers were promoted to sub-lieutenant (E.) on June 30.

FILMS IN THE NAVY.

In May the Admiralty announced their decision to equip all H.M. ships, down to and including river gunboats, with a sound reproduction installation for the purposes of training, and the dissemination of orders and important news—e.g. the news bulletins of the B.B.C. The equipment will also be suitable for the reproduction of ordinary sound films, gramophone records and broadcast music; and its use for entertainment purposes is authorised on the

condition that the officers and ship's company pay half the cost of maintenance, by means of a weekly levy of $\frac{1}{2}d.$ per head. The ship must also join the film circuit of the Royal Naval Film Corporation, which entails a weekly levy, varying from 1s. 3d. per head for flag officers down to 2d. for midshipmen and $1\frac{1}{2}d.$ for ratings. The Royal Naval Film Corporation is an organisation, with which the film trade is associated, which supplies first-class films to H.M. ships practically at cost price, thus providing even the smallest ships with recreational facilities of a high standard, which do so much to alleviate the tedium of remote and detached service. This could not have been done without the assistance of the Corporation, the formation of which H.R.H. the Duke of Kent greatly assisted by his sympathetic interest.

RESERVE FORCES.

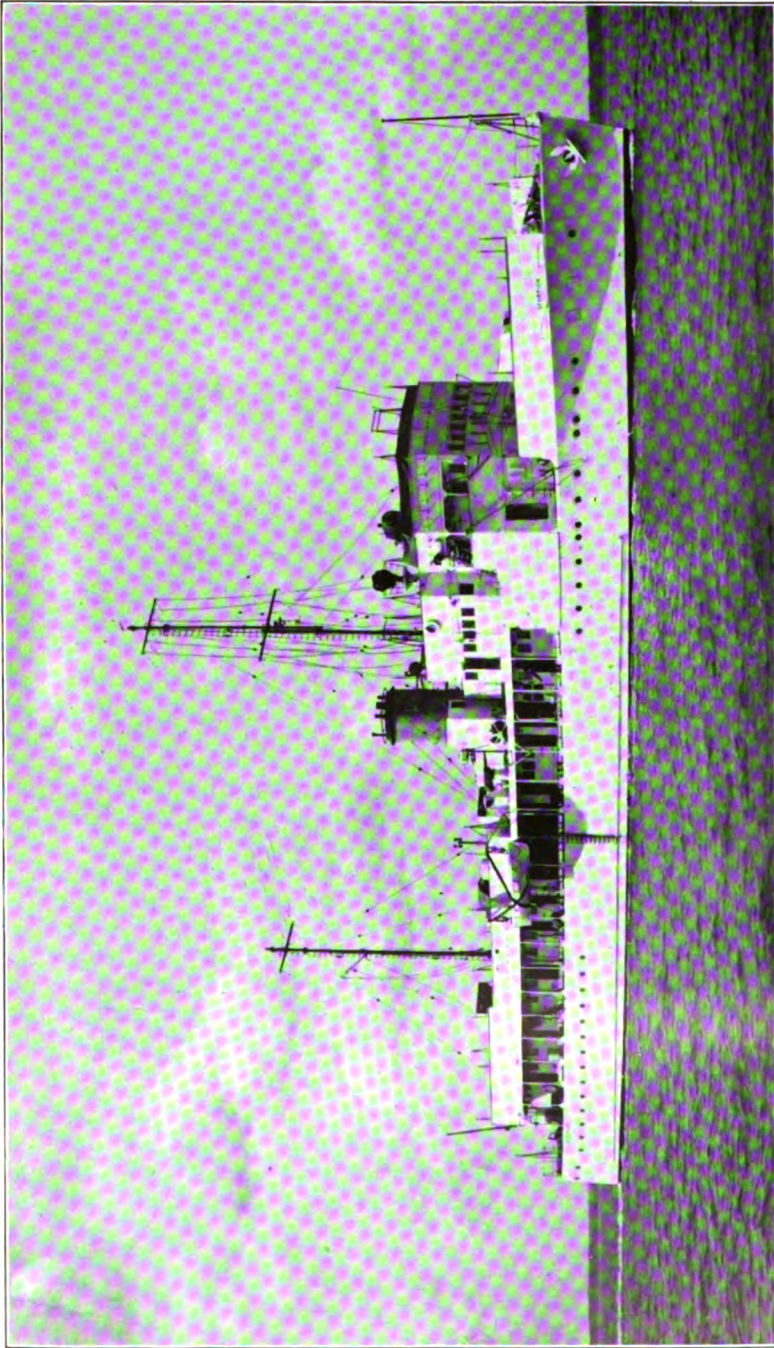
ROYAL NAVAL VOLUNTEER RESERVE.

On June 11 a reunion of the Royal Naval Volunteer Reserve and Royal Naval Division Associations was held at the Crystal Palace which, under the name of H.M.S. Victory VI, had been the depot and training centre of those two forces during the war 1914-18. A new standard for the Royal Naval Division Association was consecrated by the Chaplain of the Fleet, and then presented by H.R.H. the Duke of Kent.

At the time of the crisis in September there was a rush to join the R.N.V.R., amongst other Service units, on the part of many young men to whom the duty to take a share in the defence of their country had been brought home by the course of events. Many had to be turned away because the units to which they applied were already up to establishment; but others, who particularly desired to join the sea service, were unable to do so because there was no R.N.V.R. depot within reach of their homes. This is perhaps inevitable in many inland districts, but it seemed to be a matter for surprise that would-be naval volunteers at Portsmouth could only join up by going to Hove for all their drills and exercises. There is obviously no lack in the country of volunteers for sea service in emergency, and it would be a matter for regret if it were to prove impossible to utilise that patriotic enthusiasm afloat—where, traditionally, the strength of the country has always lain.

COURSES.

The training courses for Merchant Navy officers have been continued throughout the year, and have been extended. The Merchant Navy Defence Course, Part II, which is open to officers who have already undergone the first part of the course, is concerned with gunnery. It occupies five consecutive days—Monday to Friday—and has, if possible, to be taken without a break. Courses are held in London, Liverpool, Glasgow, South Shields, Cardiff, and Hull. Officers taking the course are repaid travelling expenses up to 50 miles, and draw a meal allowance of 5s. a day.



H.M. RIVER GUNBOAT SCORPION.

*Commissioned at Hong Kong for service as flagship of the Rear-Admiral Yangtze, November 10, 1938.
(By courtesy of the builders Messrs. J. Samuel White & Co.)*

A NEW CERTIFICATE.

A new qualification, known as the "Yacht Master's Certificate (Coastal)" has been established by the Board of Trade. Details are given in Board of Trade Notice No. 164. It is similar to the earlier Yacht Master's Certificate, but of a lower standard, covering no more than is necessary for the yacht or cruising motor-boat owner to know for his own safety and that of those whom he may meet afloat. The examination consists of papers on compass, meteorology and chart work, with an oral examination on tides, chronometers, anchor work, rigging, handling of boats, and signals. Members of the Royal Naval Supplementary Volunteer Reserve who hold this new certificate will receive special consideration from the Admiralty in the event of mobilisation.

DOMINION NAVIES.

ROYAL AUSTRALIAN NAVY.

Rear-Admiral W. N. Custance, C.B., assumed command of the Australian Squadron, with his flag in the Canberra, on April 22, in succession to Rear-Admiral Lane-Poole.

It was announced early in the year that the two cruisers to be acquired from the Royal Navy by the Royal Australian Navy would be the Apollo and Amphion, to be renamed Hobart and Perth on transfer; and that the seaplane-carrier Albatross, which was built in Australia in 1926-29 at a cost of £1,200,000, would be taken over by the Royal Navy in part payment.

The Apollo returned home from the American Station in the summer and was refitted at Devonport ready for her new service. The Albatross left Sydney on July 7, manned by the crew which was to take over the Apollo, and arrived at Devonport September 9. On October 6 she was handed over to the Royal Navy, and her crew transferred to the Apollo. She was commissioned by a British crew in November and carried out a series of trials before reducing to reserve in December.

The Apollo commissioned with her Australian crew on October 6 and on October 10 she was renamed Hobart by Mrs. Bruce, the wife of Mr. S. M. Bruce, High Commissioner for Australia, who broke a bottle of Australian wine over her bows. She left England on October 28, arrived at Fremantle on December 9 and Sydney on December 21.

The Amphion was withdrawn from the Africa Station in October for refit in England. It is intended that she shall be transferred to Australia in July 1939.

The development of Darwin as a base is making progress. The wireless telegraph station should be in operation by the end of this year. Permanent troops are to be stationed there, together with two squadrons of the R.A.A.F.; a total defence personnel of 750.

Courses for Merchant Marine officers, on the lines of those started in the United Kingdom, are being held at Sydney, where an anti-submarine School is being established. Fifty-five Australian mer-

chant ships are to be equipped with guns in emergency, at a cost of some £50,000 ; the guns and mountings are already available.

In introducing the Defence Budget on December 6, Brigadier Street, the new Minister for Defence, announced an augmentation of the measures decided on a few months earlier. The total expenditure on a three-year programme was to be increased by £18,500,000 to £63,000,000, of which the Navy would take £20,548,000. Over-age destroyers would be replaced by two " Tribal " class destroyers, and twelve motor torpedo boats would be added ; all these ships would be built in Australia. Anti-submarine defences would be provided for all the principal harbours ; naval personnel would be increased to 6,770 by 1941 ; the Adelaide was to be modernised and converted to burn oil fuel. No capital ship could be obtained for the Royal Australian Navy before 1943, but the advice of the Admiralty was being sought regarding the project of providing at Sydney a dock capable of accommodating one. Port Moresby in New Guinea was being provided with defences and with a garrison which included flying-boats so as to be available as a cruiser base.

Australia's defence against external aggression, the Minister said, must depend chiefly upon the presence in eastern waters of a British fleet, based in Singapore, capable of giving security to the sea communications of the Empire. He went on to say :

" We can share the common naval defence of the British Commonwealth of Nations, but we cannot provide naval forces sufficient for our security. We can provide forces as a deterrent to aggression and the means of holding out until support is forthcoming, but we cannot, single-handed, defeat a powerful aggressor. If the component parts of the Empire do not co-operate in defence they will be left individually isolated in the face of attack of superior forces."

The Australian Government are taking energetic steps to encourage the production in Australia of various descriptions of war material. Aeroplanes and mines for harbour defence have specially been mentioned. A number of prominent industrialists have been appointed members of a Committee to advise the Government on the organisation of industry in emergency.

Oil has been discovered in South-east Gippsland, Victoria, in conditions which seem to make its commercial development possible. It has been known for some time that oil exists under various districts in Queensland, but none of the deposits so far discovered have been workable.

ROYAL CANADIAN NAVY.

It was announced in March that Canada would acquire two more destroyers from the United Kingdom, and the Comet and Crusader were taken over in May. These ships are the other two of the four which were laid down in 1930 ; they have been renamed Ottawa and Restigouche. Their sister ships, Crescent and Cygnet, were transferred to Canada in 1935 and renamed Fraser and St. Laurent. The Ottawa and Restigouche, under the command of Captain Victor Brodeur, R.C.N., left Portland on September 6 for Gaspe.

The Fraser, St. Laurent, Saguenay and Skeena visited Bermuda

and the West Indies during the year, and exercised in company with H.M. ships on the America station.

Commodore Percy W. Nelles, Chief of the Naval Staff, was promoted to Rear-Admiral on August 4. He is the first officer of Canadian birth to reach flag rank. He was 46 on promotion and had 30 years' service to his credit.

Two commanders, G. C. Jones and L. W. Murray, were promoted to Captain on August 1 and 2 respectively.

NEW ZEALAND DIVISION

The appointment of Chief of the Naval Staff and the command of the New Zealand Station, hitherto held by the same officer, have now been separated. In June Captain H. E. Horan, D.S.C., R.N., succeeded Rear-Admiral E. R. Drummond, C.B., M.V.O., as First Naval Member of the Naval Board and Chief of the Naval Staff, with the rank of Commodore, 2nd Class. At the same time Captain I. G. Glennie, R.N., also with the rank of Commodore, 2nd Class, succeeded Rear-Admiral Drummond in the command of the New Zealand Station, with his broad pendant in the Achilles.

The latter was succeeded on December 2 by Captain J. W. Rivett-Carnac, D.S.C., commanding H.M.S. Leander. The same day the Achilles left Auckland for the United Kingdom, to refit and recommission before returning to New Zealand. She was due at Portsmouth in January.

In January, 1938, the rates of Marriage Allowance in the New Zealand Naval Service were increased to the maximum allowable under the regulations—14s. a week for a seaman.

The two New Zealand cruisers visited Sydney for the sesquicentennial celebrations in February, and spent a month in Commonwealth waters.

The New Zealand defence forces are taking every available means to co-operate with those of the United Kingdom. The Minister for Defence stated in Parliament in May that, in regard to naval defence, all the essential services for the maintenance of a sea-going squadron had been started. At the same time the Minister of Finance, Mr. Nash, in a pronouncement on policy, said :

"If Great Britain is attacked, we are too. We hate all this war propaganda, but if any attack is made on Great Britain we will assist her to the fullest extent possible."

ROYAL INDIAN NAVY.

In the Budget Statement for 1938-39 the Finance Member of the Government of India, Sir James Grigg, announced on February 26 that the long-standing arrangement between the British and Indian Governments whereby the latter paid a contribution to Imperial naval defence of £100,000 a year, had been abrogated. In return the Government of India undertook to maintain a sea-going fleet of six modern escort vessels, which would be held available for co-operation with the Royal Navy in the sea defence of India.

In February H.M.I. ships Hindustan and Investigator joined the

flag of Vice-Admiral Sir Alexander Ramsay for the combined exercises at Singapore.

In the summer Rear-Admiral H. FitzHerbert, with his flag in H.M.I.S. Clive, and the Indus, Hindustan and Lawrence in company, made a cruise in the Persian Gulf.

Chief Petty Officers of the Royal Navy have been invited to volunteer for two years' loan employment in the R.I.N. as Warrant Officer of various classes. Owing to lack of accommodation, preference will be given to men without families. The period of loan may be extended for another two years at the end of the first term, and applications for permanent transfer will be considered.

SOUTH AFRICA.

Addressing the Witwatersrand branch of the Navy League on December 10, General Smuts, Deputy Prime Minister of the Union, said :

"No one can do South Africa a more serious disservice than to make it possible for this country in the hour of danger to be deprived of the protection of the Royal Navy. I hope that South Africans in their own interests, not because they are Imperialists in temper or aspiration, but for the peace of mankind, will see that nothing is done in the policy of the country that would ever deprive us of that ultimate defence which is the greatest that can be given us."

He went on to say that South Africa might not have to fight naval battles with her own resources, but she had to do everything possible to provide protection against raids. Adequate steps were being taken by the advice of the Committee of Imperial Defence to defend coastal towns. Besides a great defence scheme which was to cost £6,000,000, a great deal was being done by establishing a Naval Reserve and training young men to help in coastal defence.

Mr. Pirow, Minister for Defence, stated in Parliament in September that the defences of Cape Town and Durban were being strengthened by the substitution of 15-in. for the existing guns, and that Port Elizabeth and East London were also to be defended.

The December Navy List shows 64 officers now borne on the list of the S.A.R.N.V.R. A number of them were taken for a training cruise in February and March in H.M.S. Penzance.

The cruise round Africa of H.M.S. Thames provided an object lesson in the possibility of submarines operating off South African coasts, besides giving the forces in that area the opportunity of seeing what a submarine looks like.

A "Navy Week" was held at Simonstown in January 1938, and proved to be a great popular attraction.

NIGERIAN NAVAL VOLUNTEER RESERVE.

An Order in Council has been issued providing for the establishment of a Royal Naval Volunteer Reserve in Nigeria. All officers and men are to be available for service in the Royal Navy in case of emergency. Authority is given for the maintenance and use of vessels of war at the expense of the Colony and the Admiralty is authorised to accept any offer by the Government of Nigeria to place such vessels of war at the disposal of the Royal Navy, and to employ it as required.

H. G. T.

CHAPTER II.

FOREIGN NAVIES.

THE annual stock-taking of foreign Fleets makes it evident that there is now an almost world-wide naval race. The Washington, and to a less extent the London Treaties stayed such intensive competition for some years ; but the immense influence exerted by sea power on the outcome of the Great War left an indelible impression on all the Powers concerned, and now that to all intents and purposes restraint on building has been removed, international unrest is causing the nations to look to their navies as an indispensable form of insurance ; but the premiums seem to be mounting higher and higher year by year.

The advent of air power has greatly complicated sea warfare, and while still keeping a close watch on those surface and submarine forces which might challenge our sea supremacy with gun, torpedo, and mine, we must now be prepared to defend it against the air-borne torpedo and bomb. The anti-aircraft ship has evidently come to stay as a type of man-of-war which, in addition to the cruiser, destroyer, sloop or armed merchant ship, is now necessary for the escort of shipping. Here we are well in the van of new construction, or at any rate adaptation.

The growing submarine flotillas of the present day cannot fail to be a source of anxiety, constituting as they do a potential menace to all the sea routes to these islands and through the Mediterranean. Scientific methods of dealing with under-water craft have greatly improved since they nearly brought us to our knees in 1917-18, but like all else in war they depend ultimately on a sufficient number of trained men and a sufficient number of weapons of the right kind. The training of our Merchant Navy for self-defence is well in hand ; it is to be hoped that the personnel and material for attacking these sea pests will be ready and waiting should they be required, for time will be short if we are to deal effectively with the hordes of under-water craft which might be arrayed against us in a future conflict.

For the rest, the backbone of our Navy—battleships, carriers, fleet-cruisers, and fleet-destroyers—is adequate to maintain our sea supremacy anywhere where it might be challenged, with the exception, mentioned in last year's "Brassey," of the Far East. Until we have regained the position of being secure at home and able to muster a sufficient fleet to meet any danger which might threaten British interests in those distant waters, we cannot say we have won the naval race. But if we set ourselves boldly and openly to win it, those Powers who are now setting the pace may give us best, and

realise that for them it is a profitless contest, all the more so because our only object is to keep the seas open for all to use in peace and prosperity.

UNITED STATES.

The two appeals made in the name of his people at the time of the Czechoslovakian crisis, and subsequent pronouncements by Mr. Roosevelt, indicate clearly that the United States is not and cannot be so indifferent to what is happening on the other side of the Atlantic as a section of the American Press would lead the rest of the world to believe. It was not a matter for surprise, therefore, that scarcely a week after the Munich settlement, the President should have announced that he was having a comprehensive summary made of national defence requirements. Unlike the British Premier, he did not openly admit that there were "gaps" in these defences; he based the need to overhaul the entire budget for the fighting services essentially on technical grounds; but the result is the same.

Two major considerations must influence future policy in the development of America's armed forces; the radius of action of both surface ships and submarines is appreciably greater than it was twenty years ago, and the time is approaching when the United States will no longer be able to regard air attack as being outside the scope of their necessary defences.

At the time of this announcement, on October 14 last, Mr. Roosevelt could only say that he expected that the Army and Navy budgets to be presented to Congress in January would show a considerable increase over those of last year. He mentioned that the survey was including the questions of standardisation and mass production of war materials.

Earlier in 1938—on April 14—the Navy Department asked for, and subsequently secured an increase of over \$250,000,000 to the \$1,100,000,000 naval authorisation bill for the current financial year. The increase was accounted for by the greater size and cost of the new battleships, the increased tonnage of two aircraft carriers, and the construction of eleven auxiliary craft.

Still earlier in the year—on January 29—the President initiated and secured approval for an increase of 20 per cent. on the authorised building programme; the latter merely gave effect to the Vinson-Trammell Act of 1934 limiting naval construction to the replacement of over-age vessels, and binding the United States not to exceed the limits of the old London and Washington Treaties. The additional tonnage which this 20 per cent. increase provided for is being allocated as follows:—

3 battleships,	which will eventually bring the total to	18
2 aircraft carriers,	" " " " " " "	8
8 cruisers,	" " " " " " "	47
25 destroyers,	" " " " " " "	147
9 submarines,	" " " " " " "	58
1,000 aeroplanes,	" " " " " " "	3,000

It is estimated that this programme will necessitate an increase of 1,200 officers and 20,000 men.

It seems clear that hitherto the naval policy of the United States has been based on the principle that the existing margin of the American Fleet over that of Japan shall be maintained ; but according to a report from the Washington correspondent in *The Times* of November 21 last, if world conditions do not improve, there is a strong possibility that another great authorisation programme in the 1940 budget would make provision for a powerful Atlantic Fleet, the strength of which is estimated as 12 battleships, 6 aircraft carriers, 17 heavy and 18 light cruisers, 77 destroyers, 36 submarines, and 50 auxiliaries, the whole costing some £650,000,000. Such a force must obviously be designed as a safeguard against European aggression. Meanwhile, all construction now in hand is to be speeded up.

BATTLESHIPS.

The following is the position as regards the six new battleships already provided for :—

1936-38 Programme.—Two ships.

North Carolina, laid down in New York Navy Yard on October 27, 1937 ; due for completion in November, 1941.

Washington, laid down in Philadelphia Navy Yard on June 14, 1938 ; due for completion in October, 1942.

1938-39 Programme (as expanded).—Four ships.

These will be named the Indiana, Massachusetts, Alabama, and South Dakota. Three were ordered in November last—one in the Navy Yard, Norfolk, Virginia, and two in private yards at Newport News, Virginia, and at Quincy, Massachusetts. The fourth will be built by the New York Shipbuilding Corporation, Camden. All are due for completion in 1943.

In spite of the decision to build 45,000-ton ships in future, it is understood that all the six ships will be of the original 35,000-ton displacement. Designs for the larger class will not be ready until the middle of 1939.

AIRCRAFT CARRIERS.

Two aircraft carriers for replacements are now building ; but no details have yet been published. The first of these is to be called the Hornet. The small carrier Wasp laid down in April, 1936, is due for completion early in 1939.

The big carriers Lexington and Saratoga are to be modernised at a cost of \$7,500,000 each. The work will include the installation of new catapults and other modern equipment. Each ship is to be fitted with a bulge on the port side, which will mean that she will then have a beam of 108 feet, giving a clearance of only 2 feet in passing through the locks of the Panama Canal.

CRUISERS.

The Wichita—the last of eighteen 8-in. gun cruisers—was due to join the fleet early in 1939.

Of the nine 10,000-ton, 6-in. gun cruisers, six are now in com-

mission. The Phoenix, which seems to be rather behind her time, should be completed early in 1939, and the St. Louis and Helena, which have also been delayed, will not be ready until 1940 according to the latest reports.

Four new light cruisers in the current programme of construction will be named the Atlanta, San Juan, Juneau, and San Diego.

LEADERS AND DESTROYERS.

There are approximately sixty leaders and destroyers in various stages of construction. The standard type of leader displaces 1,850 tons, carries eight 5-in. guns, and eight 21-in. tubes, and has a designed maximum speed of 37 knots. The standard American destroyer is a craft of 1,500 tons with five 5-in. guns and eight 21-in. tubes; her designed full speed is $36\frac{1}{2}$ knots.

It is interesting to compare these figures with those for the Japanese flotilla. The latter has no leader class. Their latest destroyers on the same displacement of 1,500 tons carry one more 5-in. gun, but their full speed is only 34 knots.

NAVAL AIR SERVICE.

The U.S. Naval Air Service continues to expand rapidly: it is already more than twice as strong as that of any other Power. The number of aircraft, including shore-based, long-range patrol flying-boats—which are under naval control, is being increased from 2,050 to “not less than 3,000.”

It is reported that a new naval air base is to be established on Kodiak Island (Alaska). A glance at a spherical map will demonstrate the strategical importance of Alaska as a Pacific base.

The Expansion Bill makes provision for a new naval airship. According to *U.S. Air Services*, tentative plans are for a dirigible of about 3,000,000 cubic feet—larger than the Los Angeles, but less than half the size of the ill-fated Akron and Macon. The airship is intended as an aeroplane carrier rather than to carry out reconnaissance work herself.

PERSONNEL.

In his Annual Report, published in November last, Mr. Swanson Secretary of the Navy, recommended that the U.S. Navy should be maintained on a war footing. At present, he stated, only submarines are fully manned, and the navy's existing strength of 105,000 men permits other ships to be manned up to only 85.3 per cent. of full complement. To man ships fully will, he estimated, call for 12,000 additional men.

The officer strength should be increased from 6,565 to 7,211. The Report also advocates increased pay for officers on account of the rising cost of living.

Rear-Admiral John W. Wilcox relieved Rear-Admiral Yancey S. Williams in command of the Special Service Squadron, operating in Central American waters, last summer.

A law has been introduced which enables officers who have held



UNITED STATES CRUISER SAVANNAH.
(Official U. S. Navy Photograph, by courtesy of the Navy Department.)

such high appointments as Chief of Naval Operations (the equivalent to our First Sea Lord) to assume the rank of Admiral or Vice-Admiral on retirement, provided they have held the appointment for not less than two and a half years, and subject to the President's approval. Hitherto there has been no permanent Flag Rank in the U.S. Navy higher than Rear-Admiral, the ranks of Admiral and Vice-Admiral being held only during the tenure of certain appointments.

FLEET MOVEMENTS.

A grand review of the Fleet was held by the President in San Francisco harbour on July 14. On this occasion the usual custom of the Fleet steaming past the President was abandoned in favour of the inspection of the Fleet at anchor, which is the usual practice at British naval reviews. The President embarked in the cruiser *Houston* and steamed down the three lines of ships.

A temporary Atlantic Squadron has been formed under Rear-Admiral A. W. Johnson, who has hitherto commanded the Training Detachment. It includes the battleships *Arkansas*, *New York*, *Texas*, and the demilitarised *Wyoming*; seven 10,000-ton, 6-in. cruisers of the "*Omaha*" class; and twenty-three destroyers. It is expected that the aircraft carriers *Enterprise* and *Yorktown* will also join this force.

The Exercises, which were due to take place in January, 1939, have been referred to as being more extensive than usual. The general scheme took the form of combined operations in which the Army and Marine Corps were to take part as well as the naval units. The Fleet was due to pass through the Panama Canal into the Atlantic late in the month, and the area of the exercises was to extend as far south as the coast of Brazil and north to Culebra. A central feature of this "Problem 20" related to the defence of Panama.

JAPAN.

Japan was astute in seizing her moment for attacking China when idealism in Britain and unrest in Europe made it impossible for us to send a great fleet to the Far East, even if we wanted to, while the pacifism which held the United States in thrall minimised the danger of any interference by the most formidable navy with which she might be confronted. Nevertheless, some Japanese statesmen seem to have realised that there is a limit beyond which it would not be wise to go in challenging or ignoring Anglo-American and other foreign interests; for in the final event it might result in an overwhelming combination of naval strength being brought to bear in support of those interests.

The resources of the nation are being poured out in the effort to over-run China, and it is difficult to see how Japan can at the same time do much in the way of naval expansion. The day to day demands of the army for munitions and maintenance must necessarily compel the navy to take second place. Nevertheless, the naval budget for 1938-39 is 677 million yen. This is no less than one-fourth of the national budget. It is expected, however, that

D

over half will be raised on credit. Particulars of the new construction programme have not been made public, but a foreign Press report intimates that it will include three battleships, five 7,000-ton cruisers, eight 1,800-ton destroyers, and six submarines.

BATTLESHIPS.

All details of the designs for the new battleships are still rigidly guarded, and there continue to be rumours of vessels of 46,000 tons or more, armed with 18-in. guns. Some practical objections to these large dimensions were suggested in last year's "Brassey." Since then it has been agreed between the three Treaty Powers that battleships may displace 45,000 tons and carry 16-in. guns. In view of the predilection of the United States to be "second to none" in such matters, it seems probable that the Navy Department is fairly confident that Japan will not exceed those limits, even though she is not a party to that agreement.

AIRCRAFT CARRIERS.

The 10,050 carrier Soryu, laid down in 1934, was completed early in 1938. A sister ship, the Hiryu, laid down in 1936 is nearing completion; and the third ship of the class, the Koryu, is building.

The last of a class of three seaplane carriers—the Mizuo—was launched from the Kawasaki works at Kobe in May, 1938. This ship, like her two sisters, the Chitose and Chioda, according to a Japanese report, displaces about 9,000 tons, has a speed of 17 knots, and carries an armament of six 5-in. A.A. guns. She completes the group of these vessels provided for in the second supplementary building programme.

The oilers Kamoi and Notoro have been converted to carry aircraft, and three merchant ships have been adapted as seaplane carriers for use during hostilities in China.

CRUISERS.

The last two 8,500-ton cruisers of the "Mogami" class, the Tone and Tikuma, will carry a main armament of twelve instead of fifteen 6·1-in. guns; they will be 9 feet shorter and have nearly 4 feet more beam than their predecessors. This seems to indicate that the doubts as to how the earlier ships of the class would behave in a sea-way, expressed in this chapter two years ago, were justified. According to Press reports, the main armaments of the Mogami and Mikuma have also had to be reduced by three 6·1-in. guns. The Suzuya and Kumano have also undergone alterations which are reputed to have produced little improvement. Altogether the first four ships of this class do not seem to have been an unqualified success.

MISCELLANEOUS VESSELS.

The first big repair ship built for the Japanese Navy was launched last year. This is the Akasi, of 10,000 tons.

The Sino-Japanese war has resulted in the appearance of types of craft specially designed for landing operations. They are :—

- (1) A despatch boat of the C.M.B. type.
- (2) An armoured craft, something like our war-time M.L.'s—50 feet long and having a speed of 10–12 knots, two machine-guns and a pom-pom, with accommodation for the crew, all under light armour.
- (3) A small military landing craft of 45 feet and a speed of 8 knots, having a capacity for 40 men with a machine-gun in the bows ; draught about 3 feet.
- (4) A large military landing craft of 56 feet and a speed of about 8 knots, and a capacity for 90 men. The engine and steering position, aft, are protected and the propeller is of the worm type in a tunnel ; draught about 3 feet.

These craft were transported in a mother-ship of about 10,000 tons having a hangar forward. Deck stowage for category (2) is aft, for category (3) amidships on the top deck, and hatches in the ship's side at the water-line give access to category (4). Large flap doors give access to a flat stern over which, it appears, the landing craft are launched.

FRANCE.

The most hopeful signs that France is going to put her defences in order are the Decrees issued late in 1938 whereby the forty-hour week was terminated and drastic measures ordained for improving the state of her finances.

A supplementary *Tranche* makes provision for two 35,000-ton capital ships ; one 8,000-ton cruiser ; five 800-ton destroyers ; seven submarines ; 10,000 tons of auxiliary craft ; and three fleet oilers. These ships were due to be laid down before January 1, 1939. They are in addition to the standard 1938 Programme—detailed in last year's "Brassey." The latter provided for : two air-craft carriers ; one 8,000-ton cruiser ; three 1,172-ton destroyers and three more of 1,000-tons (classified as torpedo boats) ; and four 800-ton submarines, at an estimated total cost of nearly £20,000,000 ; but of this only £260,000 was to be charged to the 1938 budget.

BATTLESHIPS.

France was a party to the protocol which provided for the new limitation of capital ships at 45,000 tons displacement ; but she subsequently announced that she would not build vessels of over 35,000 tons unless another Continental Power exceeded that tonnage.

The 35,000-ton battleship *Richelieu*, which has been building since October, 1935, was due to be floated out at Brest in November last, but was subsequently delayed until January of this year ; she is due to be completed before the end of 1939. Details of this ship and her sister—the *Jean Bart*—were given in last year's "Brassey." The latter is due for launching early in 1939 and for completion in 1940.

The order was signed in August last for laying down one of the two battleships provided for in the Supplementary Programme. She will be similar to the Richelieu and will be named the Clemenceau. The fourth ship will be the Gascogne and is due to be laid down this year.

The Strasbourg—officially classified as a battle cruiser, although she nominally joined the fleet in June last year, was not actually to be ready for service until January, 1939. Further details of this ship are now available. They are as follows: length, 705·4 ft.; breadth, 101·4 ft.; draught, 25 ft.; H.P., 125,000; speed at least, 29·5 knots; armament, eight 13-in. guns in two quadruple turrets, sixteen 5·1-in. guns in turrets; twelve 4-in. and sixteen 1·4-in. A.A. guns; four aircraft. Radius of action, 4,600 miles; complement, 66 officers and 1,315 men.

AIRCRAFT CARRIERS.

Orders were given in April, 1938, for laying down one of the two aircraft carriers of the 1938 standard programme. She is to be named the Joffre. The second ship will be the Painlevé. It is understood that they will displace about 18,000 tons, have a designed speed of 32 knots and carry an armament of eight 5·1-in. A.A. guns.

CRUISERS.

In August last, Rear-Admiral Lacroix took over the command of a newly constituted Second Light Squadron. This will ultimately consist of eleven of the very fast and well-armed contretorpilleurs which are really light cruisers. The Squadron will consist of:

- 6th C.-T. Division: Mogador (flag).
- 8th C.-T. Division: L'Indomtable, Le Malin, Le Triomphant.
- 10th C.-T. Division: Le Fantasque, Le Terrible, and l'Audacieux.
- 4th C.-T. Division: Tigre, Lynx, and Panthère.

The flag will be carried by Le Fantasque until the Mogador is ready. The Volta will not join until still later.

DESTROYERS.

The comparatively small number of destroyers building all seem to be much behind time. Le Hardy, which figures in the 1932 programme, was not laid down until 1935; she was launched in July, 1938. Of this class of eight 1,772-ton destroyers, four have been launched and eight more are projected. Four 1,000-ton destroyers, officially classed as *torpilleurs légers* have been laid down and three more are projected.

SUBMARINES.

Five first-class submarines of the "Morillot" class are due for completion in 1940. These craft displace 1,605 tons on the surface, 2,100 submerged. They are expected to have the high surface speed of 23 knots, although the submerged speed is only 10 knots. The

armament will be nine 21·7-in. and two 15·7-in. tubes ; one 3·9-in. and two 13-mm. A.A. guns.

Nine second-class submarines of the "Aurore" class are building or projected. They displace 805 tons on the surface and carry the same armaments as the first-class submarines, except for the two 15·7-in. tubes. Their surface speed is 14·5 knots.

NAVAL AIR SERVICE.

The Ministry of Marine, like our own Admiralty, appears to have been suffering from the dual control of naval aircraft. According to an article in *Les Ailes* by Commandant Langeron in the early part of last year, there have been numerous cases of delay in supply and of defects. It is also reported that a large proportion of these aircraft are out of date. A commission of naval engineers has investigated the practicability of the Ministry supplying its own aircraft.

MISCELLANEOUS.

The following are some of the more important changes in the higher commands made in the course of last year. Vice-Admiral Gensoul was appointed to command the Atlantic Squadron, and Vice-Admiral Ollive the Mediterranean Squadron. The latter was relieved as Deputy Chief of the Naval Staff by Rear-Admiral Tavera. Rear-Admiral Odend'Hall has been appointed to the Naval War and Staff Colleges, and Rear-Admiral Michelier to be Head of the *Aéronautique Navale* at the Ministry of Marine.

Captaine de Vaisseau Denis de Rivoyre is now Naval Attaché in London.

The *Collège des Hautes Etudes de Défense Nationale*, which is the equivalent to our Imperial Defence College, includes amongst its students for the 1938-39 course ten officers or civil servants from the Ministry of National Defence in War, and five from each of the Ministries of Marine and Air.

The sum provided to support the French Mercantile Marine has been increased from 4,000,000 to 20,000,000 francs. This is paid to shipowners in proportion to the sums borrowed by them. The amount available for speed premiums has also been increased from 1,500,000 to 10,000,000 francs. The object is stated to be to encourage the construction of new tonnage, especially oil tankers. There has been a serious falling off in French mercantile tonnage, which *Le Temps* has attributed to the application of the 40-hour week and the consequent huge increase in wage costs.

GERMANY.

At the end of 1938 the German government notified our Government that they intended to exercise certain rights conferred upon them by the Anglo-German Naval Agreements of 1935 and 1937. In accordance with the undertaking that there should be friendly discussion before such rights were exercised, it was arranged that

representatives of the British Admiralty should fly to Berlin and interview the German naval authorities. The ensuing meeting, it is understood, was most amicable.

Under that Agreement, Germany might "in special circumstances"—of which she was to be the judge—increase her submarine tonnage from a ratio of 45 per cent. of that of the British Commonwealth to one of 100 per cent., provided that the total tonnage of her Fleet still did not exceed a ratio of 35 per cent. of that of the British Fleet. The German government claim that those circumstances have now arisen. Although it has been given out that it is not their intention immediately to build up to a 100 per cent. ratio, yet there can be very little doubt that that is their ultimate aim.

They have also announced that two more "A" class (10,000-ton, 8-in. gun) cruisers will be provided in order to complete their full quota of five of these ships. In spite of these projected increases to their navy, they will have no difficulty in keeping within the 35 per cent. total ratio if there are no further additions in other classes beyond those already provided for.

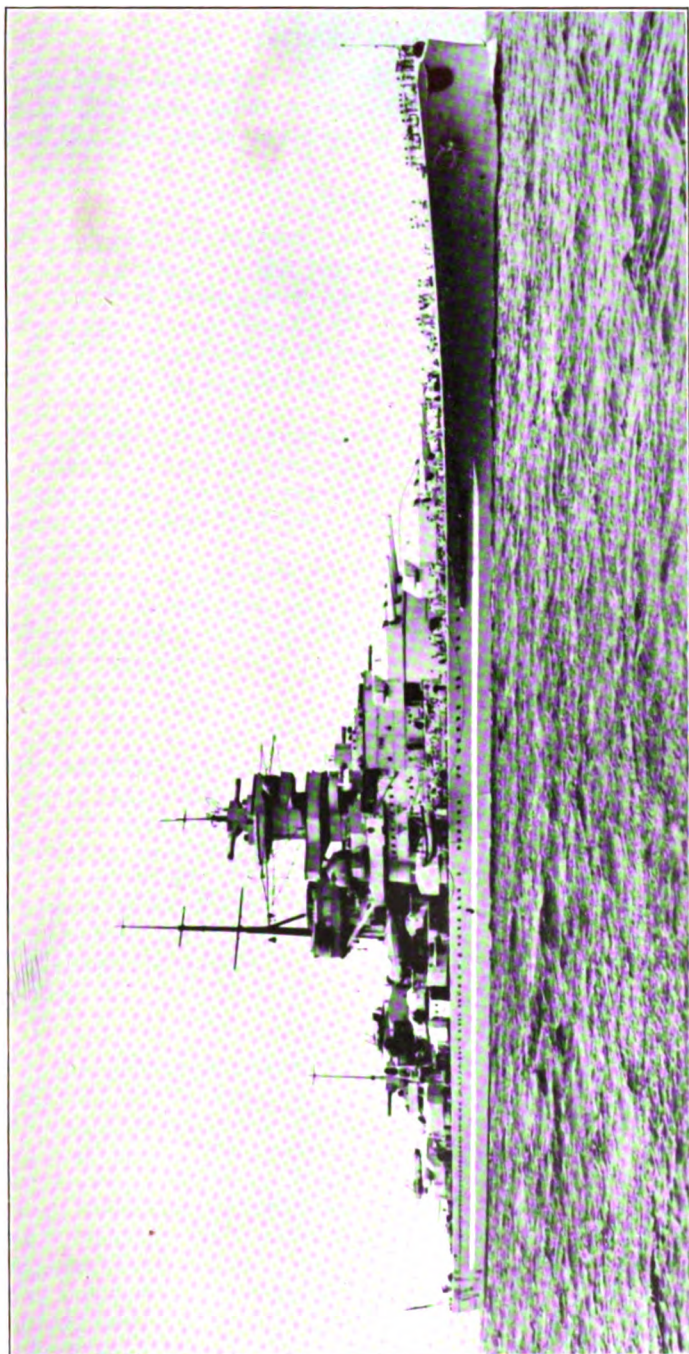
It is not at all clear what are the "special circumstances" which justify the increase of submarine tonnage. Recent additions to the Soviet Fleet appear to be the main argument, and in the matter of cruisers it seems quite logical; but it is well known that the answer to the submarine (which Russia is supposed to be acquiring in large numbers) is not the submarine.

Germany is a party to the Protocol which prohibits "sink at sight" submarine warfare against merchant shipping, and she is entirely within the letter of her rights in making this increase; nevertheless it calls for compensatory anti-submarine measures by ourselves and other countries: the experience of the late war is too well remembered for it to be ignored.

BATTLESHIPS.

Strictly speaking, Germany has no battleships yet, except the three very old vessels of the "Hannover" class which she was allowed to retain after the War, and which are now little more than training ships. She has two 35,000-ton ships building; but the largest warships she has in commission is the 26,000-ton Gneisenau, officially classified as a battle cruiser. A sister-ship, the Scharnhorst, is due to commission early in 1939. Next to these in size come the three so-called pocket-battleships of the "Deutschland" class, displacing only 10,000 tons, and so lightly armoured that they are really only glorified armoured cruisers.

The "Gneisenaus" are interesting as showing adherence to the long-standing policy of sacrificing something in the calibre, and consequently weight, of the main armament and putting the extra tonnage thereby available into protection and speed: a policy which stood German capital ships in good stead in the Great War.



GERMAN BATTLESHIP GNEISENAU.

Completed 1938.

(By courtesy of the German Ministry of Marine.)

AIRCRAFT CARRIERS.

Such details as are known about the two 19,250-ton carriers laid down in 1936 were given in last year's "Brassey." There are no ships of this class yet in commission.

CRUISERS.

The following is the position in regard to Germany's cruiser strength. All three of the 10,000-ton, 8-in. gun cruisers are now afloat, the third having been launched in August last by Frau von Horthy—wife of the Regent of Hungary—and named the Prinz Eugen. Her sister ships, the Blücher and Admiral Hipper, launched in 1937 are nearing completion. Two more are to be built, making five of this class.

Two 10,000-ton cruisers of a different class, known as "K" and "L," have been building since 1937. They were originally intended to mount 5·9-in. guns, but are now to be armed with 8-inch.

Three cruisers of 7,000 tons, also to be armed with 5·9-in. guns, are projected.

Then there are the five 6,000-ton cruisers of the "Nürnberg" and "Köln" classes, and the slightly older Emden.

When the ships building and projected are completed, Germany will have fourteen cruisers.

TORPEDO CRAFT.

Sixteen 1,625-ton destroyers whose armament is five 4·8-in. guns and eight 21-in. tubes are, or shortly will be, all completed. They have a designed speed of 36 knots.

Ten ships of a larger class, 1,811 tons, are building. Eighteen torpedo boats of 600 to 800 tons for coast defence and anti-submarine services are on the stocks. There is also a flotilla of twelve post-War and four pre-War torpedo craft of 800 tons.

Thirteen motor torpedo boats are in service and eleven more are building.

SUBMARINES.

Twenty-four submarines of 250 tons, and at least twenty of 500 to 700 tons had been completed by the end of 1938. It is believed that another twenty-seven of the larger size are building and will be completed during the current year, making seventy-one in all. These would give Germany the 45 per cent. ratio of British submarine tonnage which she originally accepted. As Britain has only seventy-three submarines built, building, and projected it would appear, at first sight, that Germany is already approaching parity in these craft; but, it will be noted, ratios are reckoned in tonnage and not in numbers, and the present German submarines are much smaller than most of ours. It cannot be said that this method of comparison is altogether satisfactory.

There is reason to believe that it is the intention to build under-water craft of 1,000 tons or more when the supplementary

programme is put in hand. This, however, seems hardly to accord with the explanation that they are needed primarily to counter a potential enemy in the Baltic.

PERSONNEL.

Rear-Admiral von Fischel is now head of the German Navy Office in the Admiralty, and Rear-Admiral Marschall, Commander-in-Chief, Armoured Ships.

The officer strength of the German Fleet, as shown in the Navy List, is roughly 50 per cent. of that of the British Navy (4,332 to 8,924); but the British figure includes 1,232 warrant officers whose duties are performed by chief petty officers in the German Navy. On the other hand, the German figure includes 1,527 subordinate officers, of whom 300 are due to be seconded later to the naval branch of the Air Force. This branch (known as *Luftkreis VI*) is responsible for the coastal area as well as the fleet-air arm. During the past year three lieutenant-commanders, fifty-seven lieutenants and a hundred and sixty-two midshipmen were attached to it.

Admiral Raeder, C.-in-C. of the German Navy, visited Vienna last autumn to reorganise the Danube flotilla. This force was taken over after the occupation of Austria and placed under a *Kapitan zur See*. A recruiting campaign for the German Fleet has been started in the new addition to the Reich.

ITALY.

The naval budget for 1938-39 amounts to 2,013,000,000 lire; this is 155,000,000 lire more than the budget for the previous year. It is the intention that by 1941 Italy shall have a fleet of 700,000 tons, all the units of which shall be under twelve years old. Admiral Ducci, in a statement to the Senate on the naval estimates last year, said that by that date there would be eight battleships, four of which would be over 35,000 tons. The Italian torpedo craft could compare with those of any other navy and their total tonnage was on a par with that of France or with such strength in that class as Great Britain could afford to maintain in the Mediterranean. One hundred and five submarines might appear to be an enormous number; but, he said, in a war it would be impossible to keep more than a third of them in commission, owing to the need for refits and wastage among the crew.

He also alluded to the difficulty of defending Italy's naval bases from air attack, and said that the country had not many spacious natural ports, and those which existed "had lost much of their value as a result of the changed political situation." The construction of a third big dock in Southern Italy was indispensable.

BATTLESHIPS.

There are now four 35,000-ton battleships in various stages of construction. The first two—the *Vittorio Veneto* and the *Littorio*—were launched in the summer of 1937 and should be completed

before the end of 1939. The second pair were laid down during 1938, the *Impero* at Genoa on May 14 and the *Roma* at Trieste on September 18. All these ships will carry 15-in. guns. Some details of the first two were given in last year's "Brassey."

The extensive modernisation of the old battleships *Doria* and *Duilio* on the same lines as that already carried out in the *Cavour* and *Cesare* are in hand.

AIRCRAFT CARRIER POLICY.

It was officially announced last year that Italy will not build aircraft carriers. It is believed that the speed and range of modern aircraft, and the limited carrying capacity of carriers render the latter of little value for work in the waters in which she is interested. Carriers, it is stated, are expensive and require escorts. One of them could carry 20 bombers and 20 scouting aircraft, but Italy could assemble a much greater force from her land bases in a short time. The Italian air force at the beginning of 1938 provided 106 aeroplanes for battleships and cruisers, four and three on each type respectively; 180 scouting aircraft in fifteen squadrons; and 80 torpedo bombers; a total of 414.

CRUISERS.

All twelve of the 3,500-ton *esploratori* (scout) class were due to be laid down by the end of 1938. It is reported that these vessels are to be armed with eight 5·5-in. guns and that they will have a designed speed of 39 knots. They will have a powerful A.A. armament and torpedo tubes, and will be equipped to carry mines. They would seem to be a reply to the French "*Mogadors*" which, on a nominal displacement of 2,884 tons, carry eight 5·4-in. guns and nine 21·7-in. tubes, and have a designed speed of 38 knots. They are to be completed within two years. The following names have been assigned to them: *Attilio Regolo*, *Scipione Africano*, *Caio Mario*, *Claudio Tiberio*, *Paolo Emilio*, *Cornelio Silla*, *Ottaviano Augusto*, *Pompeo Magno*, *Ulpio Traiano*, *Vipsanio Agrippa*, *Claudio Druso*, and *Giulio Germanico*.

TORPEDO CRAFT.

The twelve 1,620-ton destroyers of the "*Alpino*" class were all launched by the end of 1938, as were the sixteen 679-ton torpedo boats of the "*Partenope*" class.

When these are completed the total strength of Italy's flotilla will be sixty destroyers and eighty-three small destroyers or torpedo boats; but of these, five of the former and thirty-four of the latter are over-age (i.e. 16 years old).

MISCELLANEOUS.

Larger classes of officers are now going through the Royal Naval Academy at Livorno in order to provide for the ever-growing Fleet. The established strength will provide for 2,275 executive and 1,030 engineer officers. This increase is due to be completed by 1942.

A Grand Naval Review took place off Naples in connection with Herr Hitler's visit in May of last year. The King of Italy, Signor Mussolini and Herr Hitler embarked in the battleship Cavour and witnessed manœuvres by the Fleet, exercises by destroyers and submarines, and an 8-in. gun practice by the cruisers Fiume and Zara at the target ship San Marco. The *pièce de résistance* was a concerted manœuvre by ninety submarines which then dived below periscope depth, surfaced and fired a salute of 21 guns.

Coastal and anti-aircraft batteries in naval areas which have hitherto been manned by the navy are being transferred to a new branch called the Coastal Militia. They will still be under naval control, but a large personnel will be released for service afloat.

SOVIET UNION.

The Soviet navy, like the army, has suffered severely from that "liquidation" of its more experienced officers in which the government has indulged so freely ever since the Revolution, but especially during the past year or so. The offices of the Commanders-in-Chief and Chiefs of Staff of all the important commands have been "purged" during the past year, and the number of officers still serving who entered the navy before November 1917 is stated to be not more than two hundred. On the other hand the political element is being continually strengthened. War Councils, which had fallen into disuse, have been revived and Commanders-in-Chief are now subject to the will of their local War Council. Recent orders have called attention to the fact that the Captain of a ship is not the senior, but the co-equal of his Commissar, and the Chief of a fleet, squadron or flotilla must have his decision approved by his supervising officer.

A truly Gilbertian decree makes the entirely unprofessional Commissar responsible for ensuring the "success of the operation." Every Commissar during manœuvres must prove himself a real leader. Many are accused of having directed affairs from their cabins or even failing to go to sea with their ships. But the crowning touch of all is that inexperienced commanding officers must be "given a helping hand" by these ignorant amateurs.

Each Political Officer, whether afloat or in a naval establishment ashore, now has a Deputy drawn from the lower deck whose special mission it is to increase political influence amongst the ship's companies.

Typical of the effect of this political interference in the practical work of the fleet was the interruption of important operational signals during the manœuvres in the Black Sea last autumn through the Commissar of the battleship October Revolution making a general signal of great length reporting on the excellent political morale of the ship's company.

Even Soviet naval strategy is being "purged," according to the *Red Fleet*. This publication speaks of enemies of the people working within and without the walls of the Naval Academy who try "to create doubt in the minds of young commanders in connection with



**MASSED DISPLAY BY ITALIAN SUBMARINES BEFORE SIGNOR MUSSOLINI AND HERR
HITLER, MAY 5, 1938.**
(Photo by Sport and General.)

the possibility of building an invincible Soviet Navy." Wreckers, it alleges, have also been found amongst the "young school" of theorists who preach that the best policy would be to concentrate on light naval forces, such as submarines and mine-layers, for the defence of Russia's coasts rather than attempt to build a fleet to dominate the seas and destroy an enemy's commerce and communications far from Soviet bases. Ringleaders of these miscreants, who are accused of operating under instructions of foreign intelligence services, have been unmasked by political police, according to this paper; but it still remains to clear out the remnant of these enemies and to "enrich the Bolshevik strategy and tactics of our powerful Socialist navy"—whatever that may mean.

All this is part of the process officially referred to as the "Bolshevisation of the navy," and quite obviously is inspired by extreme distrust of any organization which is entrusted with armed force lest it be turned against the dictatorship. In short, the whole service is riddled with political espionage and the position of the officers has been systematically undermined so that the efficiency and discipline of the personnel is now of a low order. In such circumstances, the Soviet fleet cannot be given the status which it might otherwise claim by virtue of its tonnage and the number of its various units.

After being neglected during the first two "five-year plans" the navy is now taking an increasingly important place in national propaganda. Kalinin has urged that it must be increased until Soviet Russia is a greater naval Power than Britain; but it should be noted that at the time when he made this ambitious announcement he was speaking as a candidate—unopposed—for the Supreme Council.

There is accumulating evidence that Russia has been negotiating in the United States for some time to purchase the essential component parts for two 35,000-ton battleships; but it is doubtful whether these vessels are yet in course of construction.

The cruiser Kirov, which was thought to have been laid down as long ago as 1913, but which is now known to be a new ship laid down in 1936, and a sister ship, the Maxim Gorki, are now completed. Italian specialists are believed to have assisted in their construction. These ships displace about 8,000 tons and carry six 7.1-in. and four 4-in. A.A. guns, six 21-in. torpedo tubes and two or three aircraft. They are lightly armoured and credited with a speed of 35 knots. Two sister ships—the Kubyshev and Orjonikidze are under construction at Nikolaiev.

A half-built cruiser laid down in 1914 has been converted into an aircraft carrier and named the Stalin. This vessel was launched last year. It is reported that a second carrier, to be called the Krasnoye Znamya is under construction and that she will displace 12,000 tons, be armed with twelve 4-in. guns and carry forty aircraft. A third carrier is projected.

A cruiser minelayer of 3,500 tons, the Marti, is completing at Leningrad. She is reputed to be designed to carry three hundred mines and to have an armament of four 5.1-in. A.A. and four 37-mm. A.A. guns, with a speed of 25 knots.

Another interesting class which is making an appearance in the Soviet Navy is a group of nine big destroyers, displacing 2,600 tons, carrying five 5·1-in. and four 37-mm. A.A. guns, and six 21-in. torpedoes, with a designed speed of 38 knots.

Precise information about all the units of the Russian Fleet is unobtainable, but it is certain that the submarine flotilla is being steadily augmented and the approximate figures for these craft are believed to be 134 completed and 30 building, of which many are minelayers.

SPAIN.

The Powers still refusing to concede belligerent rights to Spain, there is not the scope for the rival naval forces which there otherwise would be. General Franco has recently shown some disposition to take the law into his own hands and on November 3 last, an armed auxiliary vessel, the *Nadir*, belonging to his fleet intercepted a Spanish government steamer, the *Cantabria*, in the North Sea about ten miles off Cromer, shelled and sank her. Eleven of the crew were saved by a British steamer, and the captain, his family and a steward were rescued by the *Cromer* lifeboat. The *Cantabria* was carrying a cargo of wood from Russia.

The next day the Nationalist auxiliary cruiser *Ciudad de Alicante* captured another small Spanish Republican steamer and took her into Emden to refuel.

For the most part the Spanish Republican fleet has been inactive ; but following a bombardment of Sagunto and Valencia by three Nationalist cruisers about a fortnight earlier, the cruiser *Libertad* and three destroyers made a spirited attack on the Nationalist ships off Cartagena on the night of March 5-6 of last year. The new 10,000-ton cruiser *Baleares* was hit by three torpedoes and sank with the loss of 600 officers and men. Rear-Admiral Vierna in command of the squadron was amongst those who perished. The rest of the Nationalist ships scattered and the only survivors were rescued by the British destroyers *Kempenfelt* and *Boreas*.

This was a serious blow to the Nationalist fleet, but later in the year it gave proof that it had not been deprived of its initiative. The Republican destroyer *José Luis Díez* which took refuge first at Falmouth and then at Havre after the fall of Santander in August, 1937, attempted to run through the straits of Gibraltar on the night of August 26-27, 1938, and to reach home waters. The Nationalists spread a screen to catch her and she was waylaid about 3 a.m. by the *Canarias* and three destroyers. A running fight ensued in which the Republican ship was crippled by an 8-in. shell in the bows from the Nationalist cruiser. She limped into Gibraltar with the crew space and forward compartment flooded. Her casualties were twenty-six dead and ten wounded. She was allowed to remain there until she made such temporary repairs as would make her seaworthy. In the early hours of December 30 she endeavoured to leave harbour under cover of darkness and make for Cartagena. The Nationalist naval patrol consisting of four minelayers of the "*Jupiter*" class supported by two large cruisers, one of which was the *Canarias*,

were lying in wait for her. In the course of a running fight in which she attempted to escape by keeping close inshore round Europa Point, the José Luis Diez was again damaged by shell fire and ran ashore in Catalan Bay, her casualties being four killed and ten wounded.

The survivors were taken off by H.M.S. Vanoc and later in the day the destroyer was re-floated and towed back to Gibraltar.

The steps taken by the Powers as a result of the Nyon Agreement seem to have practically put an end to the activities of Nationalist, or ostensibly Nationalist, submarines in the Mediterranean.

The following was the strength of the rival fleets at the end of 1938 :

	Republican.	Nationalist.
Battleships	Jaime I (badly damaged)	—
Cruisers, heavy	—	Canarias
„ light. . . .	Miguel de Cervantes	Almirante Cervera
	Libertad	Navarra
	Mendez Nunez	
Destroyers	About 12 *	About 6 (plus 2 building)
Torpedo Boats	About 6	5 or more
Submarines	About 5	About 6

Both sides have a number of gunboats and other craft of small fighting value.

The Nationalist cruiser Navarra (ex Republica) has undergone extensive reconstruction and now carries six 6-in. guns mounted singly on the centre-line, one being superimposed forward and one aft. She also has four 4-in. A.A. guns.

The two destroyers building at Cartagena were laid down in 1936. They have been given the names Alava and Liniers. They are similar to the "Churruca" class and displace 1,650 tons but will carry four instead of five 4·7-in. guns, which will be of a new type ; four 25-mm. A.A. guns on twin mountings ; and eight 21-in. (quad-ruple) tubes.

OTHER EUROPEAN COUNTRIES.

DENMARK.

Names have been allotted to ships of the new construction programme as follows : Lindormen—minelayer ; Søløven, Søbjørnen, Søulven—minesweepers ; Freja—survey ship. The torpedo boat Søløven has been renamed Søridden. The Lindormen is a craft of about 550 tons displacement and will carry two 3-in. and three 20-mm. guns as well as her complement of mines. The minesweepers are small vessels of 270 tons.

GREECE.

The two destroyers completing for the Greek Navy in Messrs. Yarrow's yard at Scotstown have been given the names Vasilevs Georgios I and Vasilissa Olga. They displace 1,350 tons, carry four

* Includes the José Luis Diez at Gibraltar.

4·7-in. guns and eight 21-in. torpedo tubes (quadruple) and have a designed speed of 36 knots. They are due for delivery early in 1939.

Two more vessels of the same type are to be built in Greek yards when the British-built prototypes are available for guidance.

NETHERLANDS.

Events in the Far East have caused the Dutch government to make special efforts to strengthen their fleet in the East Indies where valuable colonial interests are a tempting bait.

Vice-Admiral Ferwerda, Commander-in-Chief in the N.E.I., stated last summer that the new flotilla leader Tromp is due to arrive on the station during the second half of 1939, and during that year the peace strength of six destroyers and eight submarines would be attained. Twenty new Dornier flying boats were due before January 1, 1939, and eleven motor torpedo boats are to be built at the Surabaya yards during 1939-40.

The Netherland East Indies Government have stated that active measures are being taken to provide a naval force in those waters of three cruisers, two flotilla leaders, twelve destroyers, eighteen submarines, and (provisionally) 72 large seaplanes, by 1941.

The most interesting unit of the present construction programme is a new cruiser, provision for which was made in the 1938 Budget. She will displace 8,300 tons and carry ten 5·9-in. guns mounted in two triple and two twin turrets—five forward and five aft. The anti-aircraft battery will consist of twelve 1·5-in. machine-guns, and there will also be six or eight 21-in. torpedo tubes. Her designed speed is 33 knots. She will have a single funnel and the fore super structure will be in tower form surmounted by the fire control position, as in the De Ruyter. She is being built at the Wilton-Fijenvord yard, and will be the largest ship in the Netherlands Navy. A sister ship is being laid down early in 1939.

According to a report in the *Handelsblad*, there were twenty-one ships nominally under construction in the autumn of last year; but it will be a long time before they are all in service. The four destroyers building are bigger and more heavily armed than the eight of the "Admiral" class now in the East Indies. They will displace 1,628 tons, be armed with five 4·7-in. guns and eight 21-in. tubes. They are to be fitted for minelaying and have a designed full speed of 36 knots.

A new type is an armoured gunboat, seven of which are to be built, three having been ordered last year. These will be well protected and carry four 4·7-in. and four 1·5-in. A.A. guns, and also depth charges; their designed speed is 18 knots.

The new submarines K.XIX and K.XX will be the first submarine minelayers in the Dutch Navy. They will each carry forty mines as well as eight torpedo tubes. The next class, K.XXI-K.XXVII, will be larger than their predecessors. All the "K" class are already on or destined for the East Indies station.

The Naval Air Service is being strengthened by the addition of

forty-eight Dornier flying-boats. These are described as being very seaworthy.

NORWAY.

The most recent additions to the Norwegian fleet are three destroyers of about 600 tons displacement carrying an armament of three 4-in. and one 40-mm. A.A. guns, and four 21-in. torpedo tubes. A fourth ship of the class was laid down in July, 1938, and is due to take the water in February, 1939. Two larger destroyers of 1,170 tons carrying three 4·7-in. and two 40-mm. A.A. guns, and four 21-in. tubes are to be laid down during the current year. Their designed speed will be 32 knots and they are due to be completed in 1943.

Two 350-ton minesweepers are building at Oslo. The foregoing is the only new construction in hand for the Norwegian Navy.

From time to time reference is made to replacements of the Coast Defence ships which form the backbone of the Fleet but are approximately 40 years old, but so far nothing has materialised.

POLAND.

The minelayer Gryf was completed at Le Havre early last year. She displaces 2,250 tons and is propelled by two sets of Diesel engines, her designed full speed being 20 knots. In addition to a complement of 300 mines she has an armament of six 4·7-in. and two 3·5-in. A.A. guns. She is equipped to act as a training school for the senior classes of the Naval Cadet School.

The submarine Sep was launched at Rotterdam last October. She is of the same class as the Orzel, and was built at Flushing by the patriotic efforts of the Polish Navy League, which raised the necessary funds.

PORTUGAL.

A new decree law of May 2, 1938, authorised an expenditure of approximately £2,225,000 on new construction. This will provide for three destroyers of 1,400 tons; three submarines of 900 tons; six motor torpedo boats; six armoured launches (fishery protection vessels); one oil tanker; and a survey ship. Two long-range scouting seaplane squadrons; one bomber and torpedo squadron; and one reconnaissance squadron are also provided for.

The construction of the ships and aircraft is to be carried out in Portugal, but material will be purchased abroad as required.

SWEDEN.

The Navy Estimates for 1938-39 amount to 49,364,000 kroner as compared with 38,000 kroner for 1937-38. The projected programme of new construction is four battleships of 8,000 tons to carry four 10-in. and six 4·7-in. guns; four motor torpedo boats; three small submarines; and a submarine depot ship.

A second pair of 1,040-ton destroyers of the "Göteborg" class, the Karlskrona and Malmö, are due for completion in 1939, when a third pair will be laid down.

The small submarines Sjöhundden and Sjöbjörn are also due for completion during the current year.

The old coast defence ships Oden and Thor have been struck off the effective list. Built in 1897 and 1899 respectively, they were reconstructed in 1917-18 as depot ships for flying boats. It was the intention to use them as target ships before scrapping.

TURKEY.

A Turkish Naval Mission has been paying a visit to Britain. This, coupled with the substantial loan sanctioned by the British Government, indicates a strong probability that Turkey will place orders for new construction in this country or that British firms will be called in to assist and advise in building at home.

Relations between the two countries have changed, very much for the better, since the days of the Great War and its immediate aftermath, and it is all to the good that Turkey should once again regard Britain as a sort of god-mother to her Navy.

Four submarines of about 1,000 tons are building, two at Istanbul and two at Hamburg. Both the latter were launched in 1938; one is to be fitted as a minelayer.

YUGOSLAVIA.

A flotilla leader of 2,400 tons was laid down in the Adriatic shipyard works at Split in October last; Messrs. Yarrow of Glasgow are supplying machinery and boilers, and the French firm, Chantiers de La Loire of Nantes are responsible for the remainder of the contract. This vessel is some 500 tons larger than the Dubrovnik, built at Yarrow in 1932.

Three 1,210-ton destroyers are completing, one at St. Nazaire and two at Split. The engines and machinery of all these craft are by Yarrow, and they have a designed speed of 38 knots.

SOUTH AMERICAN COUNTRIES.

ARGENTINA.

The most important addition to the Argentine Navy during the past year has been the 7,000-ton training cruiser, *La Argentina*, completed at the Vickers works, Barrow. In appearance this ship resembles the British "Apollo" class, for she has two widely spaced funnels and a catapult between them. She carries nine 6-in. guns in three triple turrets, two forward and one aft; four 4-in. A.A. guns; six 21-in. tubes; and two aircraft. Her engines of 55,000 H.P. are designed to give her a speed of 31 knots.

The seven destroyers laid down in British yards in 1936 were all completed in the course of 1938. As mentioned in last year's "Brassey," they are very similar to our "G" and "H" classes. Five more of the same type are projected. One escort vessel, the *Murature*, of 1,000 tons, is building at Rio Santiago, and three more were due to be laid down shortly.

BRAZIL.

The six destroyers ordered in pairs from Thornycroft, White and Vickers-Armstrongs were all laid down during 1938. They will be vessels of 1,375 tons similar to our "H" class.

The three destroyers of the U.S.A. "Mahan" class are building at Rio de Janeiro, the materials being obtained from that country.

The second river monitor building at Rio, the *Paragassu*, is rather smaller than the *Parnahyba* which entered service early last year. She will displace 430 instead of 600 tons and carry one 4.7-in. gun and two 3.4-in. howitzers instead of one 6-in. gun and a similar number of howitzers. It will be recalled that three river monitors building for Brazil were taken up by the Admiralty early in the Great War and did very good service in such varied theatres as the Dover Patrol, East Africa and the Dwina River—North Russia, as H.M. ships *Severn*, *Mersey* and *Humber*.

Two cruisers and five submarines are projected as further units of the 1936 programme.

COLOMBIA.

At the end of last year it was arranged that a Naval Mission from the United States should in future advise on the training and administration of the Colombian Navy. This means that the services of the British retired naval officers and ratings, who have been assisting to man some of the units of the Fleet, will be terminated.

The arrangement is in accord with Colombia's desire for closer contact with the United States and a united front on the part of all the American nations against any external aggression.

CHILE.

As reported in last year's "Brassey," two 8,000-ton cruisers are projected. Tenders were invited from British shipyards last year, but orders do not appear to have been placed as yet.

VENEZUELA.

Two minelaying gunboats of 615 tons have been purchased from Italy. They were the *Milazzo* and *Dardanelli*; they have been re-named the *General Soublette* and the *General Urdaneta*. It is reported that two more vessels of this type will be purchased in 1939.

ASIA.

CHINA.

For all practical purposes the Chinese Fleet has been wiped out. Most of the vessels of any importance have been sunk, otherwise destroyed, put out of action, or transferred to the Japanese Navy.

SIAM.

A second coast defence ship, the *Dhamburi*, was launched at Kobe in January of last year. This vessel and her sister ship, the

E

Ayutia, displace 2,265 tons and carry four 8-in. guns in two turrets—one forward and one aft. Their designed speed is 15·5 knots. Two cruisers have been ordered from the Italian yard of Cantieri Riuniti dell' Adriatico, Trieste. It is reported that these will be of about 4,000 tons.

The Siamese Navy is no mean force. In addition to the above-mentioned units, it already includes: two smaller coast defence ships or monitors; a destroyer (formerly H.M.S. *Radiant*); nine modern torpedo boats; nine second-class torpedo boats; four small submarines; two modern escort vessels used as training ships; two small minelayers; and a number of auxiliary craft.

AFRICA.

EGYPT.

The first African country outside the British Commonwealth to possess any form of navy is Egypt. At present it is limited to two armed escort vessels belonging to the Coastguard and Fisheries Administration, and a patrol vessel of the C.M.B. type. But it is seriously proposed to form a navy which will include units as big as destroyers or light cruisers, torpedo boats, submarines, and minelayers. It is not improbable that Britain will be asked to assist in this project.

E. ALTHAM.

CHAPTER III.

RELATIVE NAVAL STRENGTH.

DURING 1938, Great Britain materially improved her relative naval position, both actually and potentially. At the close of the year, not only was her Fleet stronger, but she had more battleships, cruisers, aircraft-carriers and destroyers under construction than any other European Power or Japan. Nor is the building programme of any of these Powers, so far as it has been announced, of equal scope to that of the Royal Navy, so that it is safe to declare that the present superiority will be increased in the immediate future. Only in submarine construction is there a greater volume of work in hand in foreign countries, particularly Russia, Italy and Germany, a matter which may raise doubts whether the provision of destroyers and other craft suitable for anti-submarine operations is as large as it should be. In this connection, however, it has to be remembered that in the event of hostilities the regular war vessels would be augmented by the many merchant ships and trawlers converted for war work.

The claim that the Royal Navy is greatly superior to any likely European combination that might be brought against it can hardly be questioned. Mr. Churchill, a candid critic of Government policy in regard to defence in other directions, stated on November 3, 1938 : " It is the only one of our defence services which is in a high state of efficiency and which is far stronger relatively to Europe than it was in 1914." The French Minister of Marine, M. Campinchi, estimated the tonnage of the present French, Italian and German fleets in January, 1939, at 500,000, 450,000 and 170,000 respectively. It may be added that the British tonnage is more than all three put together, not less than 1,300,000 tons. M. Campinchi also stated that the three countries had the following tonnage under construction : France, 120,000 tons ; Italy, 150,000 tons ; Germany, 250,000 tons. Here again it may be added that the British tonnage under construction is more than all three put together, not less than 550,000 tons. The effect of the constructive work begun in 1935 will be felt in increasing volume in the completed Fleet in each successive year up to 1942. The Prime Minister pointed out in his speech at Birmingham on January 28, 1939, that in the twelve months ending March 31, 1939, some 60 new ships with a tonnage of about 130,000 tons were being added to the Navy, but for the ensuing twelve months the addition will be even larger—about 75 ships of 150,000 tons. Nothing like this output can be found in any other country.

The Prime Minister's survey erred rather on the side of modesty.

If carried a little further, it will be found that in the year ending March 31, 1941, the amount of tonnage to be added to the Navy will be at least double that of the year ending March 31, 1940, for it will include ships of every class from battleships and aircraft-carriers downwards. Not only so, but the prospective additions to foreign fleets show little or no increase over those of recent years. It is indeed remarkable that the amount of new construction in foreign countries, apart from submarines, has tended to diminish since the start of the British re-armament programme. Witness the following comparison of vessels in the three principal classes actually laid down during the two years 1937-1938 :—

GREAT BRITAIN.		Tons.
5 Battleships		175,000
5 Aircraft-carriers		115,000
13 Cruisers		83,600
Total		373,600
UNITED STATES.		
2 Battleships		70,000
4 Cruisers		32,000
Total		102,000
FRANCE.		
3 Cruisers		24,000
1 Aircraft-carrier		18,000
Total		42,000
ITALY.		
2 Battleships		70,000
Total		70,000
GERMANY.		
3 Cruisers		24,000
Total		24,000

No reliable figures are available concerning the ships begun in Japan. As regards the European Navies, however, it will be seen that in the classes mentioned Great Britain laid down in 1937-38 between two and three times the amount of tonnage of the others put together. Such a comparison gives some idea of the immense effort which is being made by the industrial resources of the country after 15 years of neglect.

This is a factor in relative naval strength which is apt to be overlooked. No other country possesses such resources for warship production and naval armament as Great Britain. In certain cases, despite the volume of work in hand and the general lack of skilled labour as a result of the lean years, the construction of ships is being accelerated. A case in point was that of H.M.S. Maidstone, the new submarine depot-ship, which was due for completion in the autumn of 1938, but was actually delivered by John Brown and Co., Limited, in the first week of May, 1938, two years after the placing of the order.

INCREASE IN MAXIMUM DISPLACEMENT.

During 1938, the limit to the increase in the size of battleships, the maximum displacement of which had been fixed at 35,000 tons since the Washington Conference of 1922, was raised as a result of the Japanese refusal to be bound by it any longer or to disclose whether or not she intends to build ships above such a limit. On April 1, 1938, the British, American and French Governments announced that they had agreed to relax the restrictions in this respect re-affirmed by the London Naval Treaty of 1936. France declared that she did not for the time being intend to build battleships of more than 35,000 tons, provided no other Continental Power built vessels of greater tonnage. It was officially announced on June 30, that a protocol providing for a new limit of 45,000 tons had been signed by Great Britain, the United States and France. The previous maximum gun calibre of 16 inches remains unchanged. The British Government informed all Powers with whom they were in treaty relations that they did not intend for the present to build any capital ship exceeding a standard displacement of 40,000 tons, and they trusted that the other European Powers would similarly refrain from exceeding this figure for individual ships. The First Lord of the Admiralty, in announcing the signing of the protocol to the House of Commons, added that the two British capital ships of the 1938 programme (*Lion* and *Temeraire*) would carry 16-in. guns and would not exceed the standard displacement of 40,000 tons.

Italy came within the scope of the London Naval Treaty of 1936 on December 2, 1938, when the appropriate instrument was signed in London by Count Grandi. As Germany and Soviet Russia already had bi-lateral agreements with Great Britain, all the principal naval Powers of Europe are now agreed upon qualitative limitation and the system of exchange of information about their naval construction. Japan is the only great Power which has not acceded to the Treaty. The new upper limit of 45,000 tons for battleships is higher than the British Government desired, but represents the lowest figure on which agreement could be reached. The United States was responsible, on technical grounds, for the limit being placed at 45,000 tons, but no ship above 35,000 tons had been laid down up to the end of 1938. A hint was given in the Annual Report of Mr. Swanson, Secretary of the U.S. Navy, published in November, that battleships already being built, based on the old 35,000-ton design, may actually be slightly heavier, due to additional armour and engines, now that it is not necessary to keep within the former limitation. But a 45,000-ton ship has not yet gone beyond the stage of design.

CAPITAL SHIP STRENGTH.

The strength in completed capital ships of the three principal naval Powers continues to be that agreed to in the London Naval Treaty of 1930—fifteen ships each for Great Britain and the United States and nine ships for Japan. To what extent this establishment

will be disturbed by the new construction now in hand remains to be seen. No international agreement now prevents any of the Powers from retaining their new ships as additions to existing strength, instead of as replacements of old ships. The Naval Expansion Bill of the United States, passed in May, 1938, gives legislative sanction to such an addition for the American Navy. Previously, naval construction in that country was governed by the Vinson Trammell Act of 1934, which authorised the annual programme for the replacement of over-age vessels and prohibited building in excess of the Washington and London treaties. The factor of age enters in, however, and there is obviously a limit beyond which the older ships, even if modernised, cannot be retained on the effective list.

In evidence before the Senate Naval Affairs Committee on April 4, 1938, Admiral William Leahy, Chief of Naval Operations, said that the United States was lagging behind in the observance of the five—five—three ratio established at the Washington Conference. Taking Great Britain as the basis of comparison, the ratios he gave to the Committee were :—

Capital Ships.—Britain, 5 ; United States, 3·8 ; Japan, 2·8.

Aircraft-carriers.—Britain, 5 ; United States, 2·7 ; Japan, 4·5.

Heavy Cruisers.—Britain, 5 ; United States, 2·3 ; Japan, 2·3.

Destroyers.—Britain, 5 ; United States, 3 ; Japan, 4·1.

Submarines.—Britain, 5 ; United States, 3·2 ; Japan, 3·9.

In arriving at the capital ship ratios, Admiral Leahy had evidently counted all the seven new British battleships of the 1936, 1937 and 1938 programmes, two of which had not been then laid down, but had not reckoned those of the United States programme of 1938, to be begun before January 1, 1939. Nor had he included any new ships for Japan, about which there was no definite information. The ratio of 5 for Great Britain therefore represents her maximum, that of 3·8 for the United States, the interim figure before the passing of the Naval Expansion Bill, and that of 2·8 for Japan, the minimum without any allowance for new construction. The superiority of Great Britain, however, remains and is accounted for largely by her earlier start in the resumption of capital ship building in view of her position in relation to the Continent of Europe, where such construction had already been in progress for some time before 1936—since 1932 in France, and since 1934 in Germany and Italy.

The following list shows all the armoured ships put in hand during the past ten years, or since the resumption of the building of such vessels after the post-Washington era. It will be found useful not only as indicating the extent of construction, but also the rate of building :—

GREAT BRITAIN.						
Ship.	Tons.	Guns.	Laid Down.	Launched.	Complete.	
King George V.	35,000	14-in.	1.1.1937	21.2.1939	1940	
Prince of Wales	"	"	1.1.1937	—	1940	
Duke of York	"	"	5.5.1937	—	1941	
Beatty	"	"	1.6.1937	—	1941	
Jellicoe	"	"	20.7.1937	—	1941	
Lion	40,000	16-in.	1939	—	1943	
Temeraire	"	"	1939	—	1943	

UNITED STATES.					
Ship.	Tons.	Guns.	Laid Down.	Launched.	Complete.
North Carolina	35,000	16-in.	27.10.1937	—	1941
Washington	"	"	14. 6.1938	—	1941
Indiana	"	"	} Ordered, 1938-39	—	1943
Massachusetts	"	"			
Alabama	"	"			
South Dakota	"	"			

JAPAN.

4 ships (?) 35,000 or more. No official information.

FRANCE.

Dunkerque	26,500	13-in.	26.12.1932	2.10.1935	1936
Strasbourg	"	"	25.11.1934	12.12.1936	1938
Richelieu	35,000	15-in.	22.10.1935	17. 1.1939	1939
Jean Bart	"	"	12.12.1936	—	1940
Clemenceau	"	"	17. 1.1939	—	1942
Gascogne	"	"	1939	—	1942

ITALY.

Vittorio Veneto	35,000	15-in.	28.10.1934	25.7.1937	1939
Littorio	"	"	28.10.1934	22.8.1937	1939
Roma	"	"	18. 9.1938	—	1941
Impero	"	"	14. 5.1938	—	1941

GERMANY.

Deutschland	10,000	11-in.	5. 2.1929	19. 5.1931	1933
Admiral Scheer	"	"	6. 9.1931	1. 4.1933	1934
Admiral Graf Spee	"	"	1.10.1932	30. 6.1934	1936
Scharnhorst	26,000	11-in.	1934	3.10.1936	1938
Gneisenau	"	"	1934	8.12.1936	1938
Bismarck	35,000	15-in.	1936	14. 2.1939	1940
"G"	"	"	1936	—	1941

RUSSIA.

2 ships. 35,000 — (Projected) — —

In capital ships, the position of Great Britain may be regarded as reasonably secure, up to 1943. In that year she will have completed seven ships of 255,000 tons; the United States, six of 210,000 tons; France, six of 193,000 tons; Germany, seven of 152,000 tons (or, excluding the small "Deutschlands," four of 122,000 tons); and Italy, four of 140,000 tons. The British and American superiority in older battleships, many of which have been modernised, must be taken into consideration in conjunction with this comparison.

BRITISH CRUISER STRENGTH.

The total of British cruisers on the effective list increased by three during the year 1938 by the completion of the Liverpool, Manchester, and Gloucester, no cruisers being scrapped. The number now stands at 60. This excludes the Vindictive, which has been demilitarised and is now a training ship for cadets, and the Coventry and Curlew, converted to anti-aircraft ships. Other vessels of War design are to be converted to similar duties, but

reckoning them for the moment as effective cruisers, the list in this class is made up as follows : —

"C" class, completed 1916-22, 4,180-4,290 tons, five 6-in. guns	11
Adelaide (Australian Navy), 1922, 5,100 tons, nine 6-in. guns	1
"D" class, completed 1918-22, 4,850 tons, six 6-in. guns	8
"E" class, completed 1926, 7,550-7,580 tons, seven 6-in. guns	2
"Hawkins" class, completed 1919-25, 9,770-9,860 tons, nine 6-in. guns	3
"County" class, completed 1928-30, 9,750-10,000 tons, eight 8-in. guns	13
"York" class, completed 1930-31, 8,250-8,390 tons, six 8-in. guns	2
"Leander" class, completed 1934-36, 6,830-7,215 tons, eight 6-in. guns	8
"Arethusa" class, completed 1935-37, 5,220-5,270 tons, six 6-in. guns	4
"Southampton" class, completed 1937-38, 9,100-9,300 tons, twelve 6-in. guns	8
Total	60

Of this total of 60, only 35 are of post-War types. The other 25 were all designed and laid down during the War, that is, over twenty years ago ; 21 of them are already over the age limit of 16 years from date of completion adopted in the London Naval Treaty for vessels of this class if laid down before January 1, 1920, and the other four, Emerald, Enterprise, Effingham and Frobisher, although of War design, are still reckoned as within the age limit as they were delayed in completion. Of the 35 post-War cruisers, six are serving in the Royal Australian Navy, a total which will be increased to seven when the Amphion is transferred to the Commonwealth Government as the Perth, about July next, leaving only 28 in the Royal Navy. The Belfast and Edinburgh should be ready for service by that date, thus restoring the post-War total to 30, but beyond this figure there cannot be any increase before 1940.

The policy of the Government, announced in the White Paper of March 8 1936, to provide a strength of 70 cruisers, of which 60 will be under-age and 10 over-age, cannot now be realised until 1943, owing to delays in construction. Only the Belfast and Edinburgh (1936 programme) will enter service during 1939. None of the first five ships of the "Dido" class (1936 programme) had been launched up to the end of 1938. If all these ships, with the Bonaventure and Hermione, of the same class in the 1937 programme, enter service during 1940, the total of post-War cruisers will increase to 44. There may be a further increase to 49 if the five ships of the Fiji class (1937 programme) are completed within 2½ years of laying down. The three ships of the "Charybdis" class (1938 programme) can hardly be ready before 1941, as only one of them had been laid down at the end of 1938. They will raise the total to 52. Orders for the four ships of the "Ceylon" class (1938 programme) had not been placed at the end of 1938. Their completion in 1942 will increase the total to 56, leaving four complete to the number to 60 in 1943.

The cruiser position has, however, improved materially as a result of the re-armament programme, both in relation to Continental Powers and to Japan. There are actually more cruisers building or authorised for the Royal Navy than for the combined fleets of Japan, France, Italy and Germany, and the effect of this will be to raise the standard of effectiveness of the cruiser portion of the Navy relatively to these Powers, which declined during the

years when new construction was severely limited and the Fleet was living on its War production. Abroad, building efforts are being directed more towards other classes. Italy for example, had no cruisers at all building on December 31, 1938, apart from the small light surface vessels usually classed with torpedo craft.

POST-WAR CRUISER CONSTRUCTION.

The following table shows the numbers of new cruisers completed for the principal Powers in each year since the war :—

Year.	Great Britain.	U.S.A.	Japan.	France.	Italy.	Germany.
1920	—	—	1	—	—	—
1921	1	—	4	—	—	—
1922	4	—	3	—	—	—
1923	—	6	3	—	—	—
1924	1	3	1	—	—	—
1925	1	1	3	—	—	1
1926	2	—	2	1	—	—
1927	—	—	2	2	—	—
1928	7	—	1	2	—	—
1929	4	1	3	—	1	1
1930	3	4	—	2	1	2
1931	1	3	—	3	6	1
1932	—	2	4	1	2	—
1933	2	1	—	—	3	—
1934	2	4	—	1	—	—
1935	4	—	2	1	3	1
1936	3	1	—	1	1	—
1937	6	3	2	4	2	—
1938	3	6	—	—	—	2
Totals	44	35	31	18	19	8

The following table summarises the cruiser activity of the six principal Powers during 1938 :—

CRUISERS COMPLETED DURING 1938.

Great Britain.	United States.	Japan.	France.	Italy.	Germany.
Liverpool	Brooklyn	—	—	—	Blücher
Manchester	Philadelphia				Admiral
Gloucester	Savannah				Hipper
	Nashville				
	Honolulu				
	Boise				

CRUISERS LAUNCHED DURING 1938.

Belfast	Wichita	Tikuma	—	—	Prinz Eugen
Edinburgh	Phoenix				
	Helena				
	St. Louis				

OTHER CRUISERS CONTINUED DURING 1938.

Dido	—	Tone	—	—	Seydlitz
Euryalus					"L"
Naiad					
Phœbe					
Bonaventure					
Hermione					

CRUISERS LAID DOWN DURING 1938.

Great Britain.	United States.	Japan.	France.	Italy.	Germany.
Sirius	Atalanta	5 ships of	De Graasse	—	"M"
Fiji	San Diego	7,000 tons	Chateaurenaault		"N"
Kenya	Juneau	(?)	Guichen		"O"
Mauritius	San Juan				
Nigeria					
Trinidad					

CRUISERS AUTHORISED BUT NOT LAID DOWN DURING 1938.

Charybdis	7 ships of	—	—	Cornelio Silla	—
Cleopatra	about 8,000			Paolo Emilio	
Scylla	tons			Attilio Regolo	
Ceylon				Scipione Africano	
Jamaica				Caio Mario	
Gambia				Claudio Tiberio	
Uganda				Pompeo Magno	
				Ottaviano	
				Augusto	
				Ulpio Traiano	
				Claudio Druso	
				Vipsanio Agrippa	
				Giulio Germanico	

TOTALS FOR THE YEAR.

24	21	(Number not known)	3	12	8
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The inclusion of the twelve Italian ships of the "Cornelio Silla" class in this list is legitimate, but requires a word of explanation. Italy has not laid down any orthodox cruisers, or vessels above 5,000 tons displacement, since 1933. She is, however, continuing the construction of scouts (*esploratori*), and in her 1938 programme were twelve vessels of this kind which are understood to be larger and more powerful than their predecessors, and therefore merit inclusion in a category higher than destroyers. They are reported to be of 3,500 tons, 39 knots speed, and armed with 5.2-in. guns, and are due for completion in 1940. The largest vessels of this kind built in recent years are the French flotilla leaders of Le Malin type, of 2,569 tons, armed with five 5.4-in. guns. Although designed for 37 knots, they have exceeded this rate on trial, and in May, 1938, M. Campinchi, Minister of Marine, claimed for one of them, Le Terrible, the world speed record of 45 knots. The new Italian ships are officially described as "ocean-going scouts," with a wider radius of action than the twelve of the "Pigafetta" class, the last of a similar kind, which were completed in 1931. The value attached to them may be judged by the fact that the Italians have no other type under construction between the 35,000-ton battleships and these 3,500-ton scout-cruisers.

The only other change of importance in the cruiser situation during 1938 was the decision of Germany, at the same time that she exercised her treaty right to parity with Great Britain in submarines, to arm the two 10,000-ton cruisers "K" (Seydlitz) and "L" in such a manner as to change them from cruisers of sub-category (b), those which do not carry a gun with a calibre exceeding 6.1-in., to sub-category (a), those which carry a gun exceeding 6.1-in. This will give Germany five 10,000-ton 8-in. gun cruisers. The Blucher and

Admiral Hipper were completed in 1938 ; the Prinz Eugen, laid down in 1936, was launched on August 22, 1938, and should be completed in 1939 ; and " K " (Seydlitz) and " L " should be ready by 1941. This total is exactly one-third of that of the British Commonwealth of Nations, including Australia, which has 15 cruisers with 8-in. guns, laid down between 1924 and 1928 and completed between 1928 and 1931. The proportion thus approximates to the 35 per cent. of British tonnage which Germany accepted in the naval agreement of 1935. Corresponding totals for other Powers are : United States, 18 ships ; France, 7 ; Italy, 7 ; Japan, 12.

The transfer of the two German cruisers from sub-category (b) to (a) adds to the margin, already large, in which Germany can build the smaller type. She has at present six (b) class cruisers completed and three building, whereas the British Commonwealth has 45 built and 21 building. It would therefore be possible for her to build ten or twelve more small cruisers while still keeping within the limit she voluntarily accepted in 1935.

AIRCRAFT CARRIERS.

Great Britain has a larger programme of aircraft-carriers in hand than any other Power. Including the Ark Royal, completed in 1938, she will have six new ships of 137,000 tons completed by 1942, a programme approached only by the United States, which should have, including the Ranger, completed in 1934, a similar number of ships in 1942 of rather less tonnage. During 1938 the first carrier to be specially designed for the French Navy was laid down, the Joffre ; and the first German carrier, the Graf Zeppelin, was launched. Italy re-affirmed her decision not to build such ships. In presenting the Navy Estimates on March 15, 1938, Admiral Cavagnari, Under-Secretary for the Navy, stated that the Duce had decided not to build aircraft carriers with landing decks. Signor Mussolini was right once more, he added. The rapidity of technical progress in aircraft complicated the problem of landing decks and the efficiency of aircraft generally, especially in the theatres of operation which most interested Italy and where adequate air bases had been constructed. He envisaged the use of far greater numbers of machines from land bases than could ever be borne in a carrier, a type open to further objection on the grounds of cost, vulnerability and the number of escort vessels it required.

The following is a list of the aircraft-carriers under construction for the principal navies during 1938 :—

GREAT BRITAIN.

Ship.	Tons.	Speed.	Laid Down.	Launched.	Completed.
Ark Royal	22,000	30.75	16. 9.1935	13.4.1937	16.11.1938
Illustrious	23,000	—	27. 4.1937	—	—
Victorious	"	—	4. 5.1937	—	—
Formidable	"	—	17. 6.1937	—	—
Indomitable	"	—	10.11.1937	—	—
Implacable	"	—	11.10.1938 (ordered)	—	—

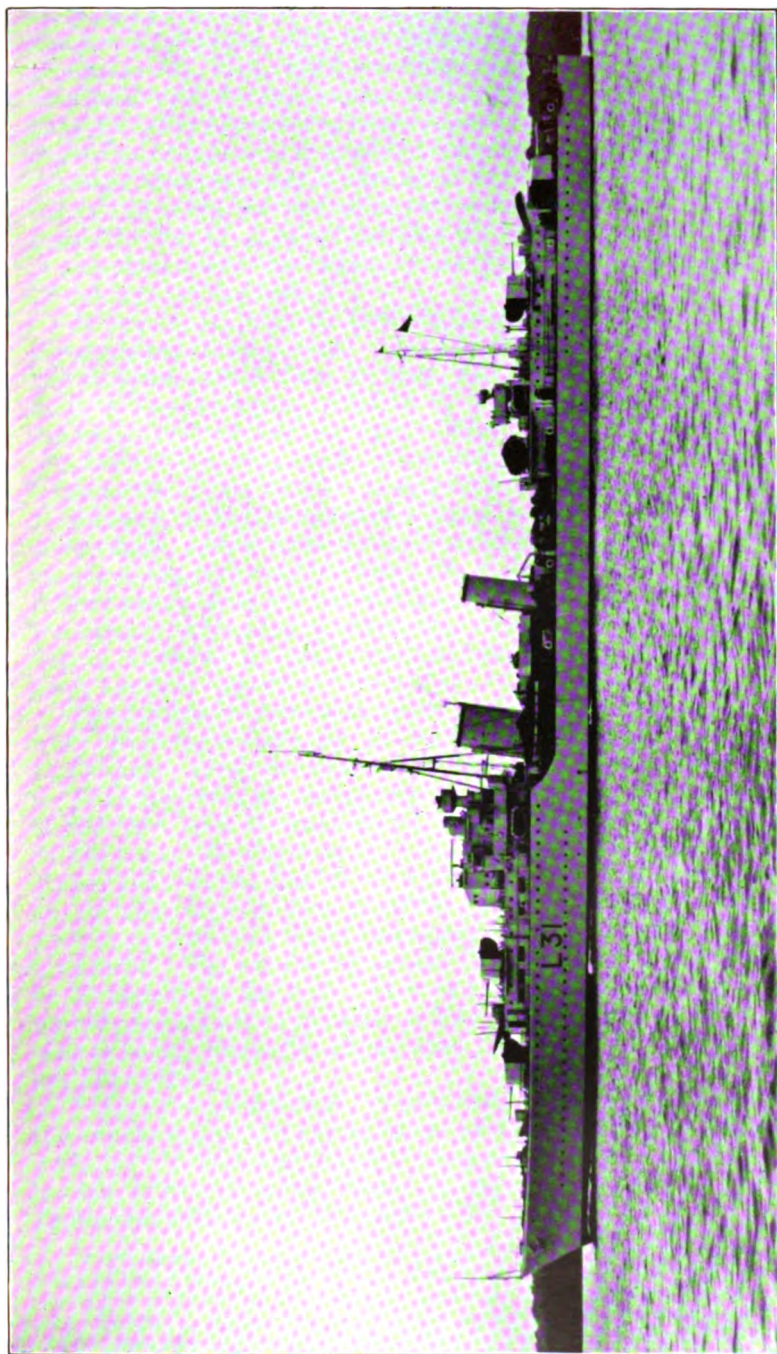
UNITED STATES.						
Ship.	Tons.	Speed.	Laid Down.	Launched.	Completed.	
Yorktown	19,900	34	21. 5.1934	4. 4.1936	1938	
Enterprise	"	"	16. 7.1934	3.10.1936	1938	
Wasp	14,700	—	1. 4.1936	—	1940	
2 ships	—	—	1938 programme (authorised).			
JAPAN.						
Soryu	10,050	30	20.11.1934	23.12.1935	1938	
Hiryu	"	"	8. 7.1936	16.11.1937	—	
Koryu	—	—	1938			
FRANCE.						
Joffre	18,000	32	1938			
Painleve	"	"	1938			
ITALY.						
(None.)						
GERMANY.						
Graf Zeppelin	19,250	32	1936	8.12.1938		
" B "	"	"	1936			

DESTROYERS.

The destroyer lists show little variation on those of last year, with the United States leading both in numbers built and building, and Great Britain a good second. Italy has risen to third place as the result of extensive building since 1934, and if that progress is maintained the combined flotillas of Italy and Germany may before long equal those of Great Britain. Qualitatively, the British destroyer strength was materially improved during 1938 by the completion of the first 11 vessels of the tribal class, the largest ever built for the Royal Navy, armed with eight 4·7-in. guns as compared with the four or five 4·7-in. of earlier destroyers. In numbers, however, the strength remains about the same at 163, whereas the submarine flotillas of most of the Continental Powers have increased considerably. The German total of destroyers built and building (38) shows no increase on that of a year ago; building effort is being concentrated on other types, particularly submarines. Russia, however, has increased her total from 25 to 36. Included therein are some twelve large destroyers of between 2,600 and 3,000 tons, built at Leningrad under the supervision of Italian engineers.

SUBMARINES.

By far the largest programme of submarine construction recently undertaken are those of Germany and Italy. There is also considerable building in Russia, although to what extent is doubtful. Not only in volume, but in rate of execution, the German and Italian programmes are remarkable. M. Paul Reynaud, the French Minister of Finance, told the Senate on December 27, 1938, that "France takes 18 months to build a submarine, while Germany can build one in eight months." Up to June, 1935, or less than four years ago, Germany had no submarines completed. At the Naval Review held on August 22, 1938, at which Admiral Horthy was present, there were 37 submarines in the lines. Another 31 were then built



H.M. DESTROYER MOHAWK.
Commissioned for service, November 16, 1938.
(By courtesy of the builders, Messrs. John I. Thornycroft & Co.)

or building, making a total of 68. It may be recalled that this number is identical with that which Germany had in service on December 31, 1915, after seventeen months of war. She began hostilities with 28 submarines, and added 65 and lost 25 during 1914-15. Numbers alone, however, may mislead unless considered in relation to size, and it must be remembered that 32 of the present German submarines are of the small coastal type of 250 tons. At the end of 1938, she had more submarines built and building than Great Britain, 71 as compared with 69, although her total tonnage, in accordance with the Anglo-German Naval Agreement, was within 45 per cent. of the British.

In December, 1938, the German Government notified the British Government, in accordance with the procedure laid down in the Naval Agreement of June 18, 1935, and July 17, 1937, of its intentions to exercise rights conferred by those agreements in regard to submarine and cruiser strength. When the 1935 Agreement was concluded, Germany, while maintaining her right to equality of tonnage with Great Britain in submarines, undertook not to exceed 45 per cent. of British submarine tonnage unless a situation should arise which, in her opinion, made an increase necessary. In such an event she undertook to bring the matter to the notice of Great Britain and to enter into friendly discussion before the right to provide the greater submarine tonnage was exercised. This promise was duly honoured by the notice given in December, and discussions took place between the two governments.

The British submarine strength at the time of the negotiations was: Built or completing, 54 vessels, 57,349 tons; building, 15, 16,780 tons; total, 69 vessels of 74,129 tons. Corresponding figures for Germany were approximately 54 vessels built or completing, of 20,263 tons, and 17 building, of 11,019 tons; total, 71 vessels of 31,282 tons. The German tonnage therefore represented just over 42 per cent. of the British, or a proportion well below that of the 45 per cent. agreed upon in 1935. If Germany implemented her right to equality with Great Britain she could build more than 42,000 tons more. The number of vessels she could add would, of course, be dependent on the type, but it is believed that she is anxious to provide herself with a number of large ocean-going vessels of 1,000 tons or more, which the 45 per cent. limitation rendered difficult if not impossible.

"Special circumstances" were cited by Germany as a reason for the course taken, the exact nature of which was not made known publicly. It was understood, however, that they concerned the growth in the Russian Fleet. A writer in the *Essen National Zeitung* on January 3, 1939, said:—

"The Soviet Union possesses the greatest submarine fleet in the world, which is a continual threat for the German Baltic coast. Russia has now 160 submarines of different classes at her disposal. Germany can never leave this fact out of consideration. She is, unfortunately, far less distant from the Russian ports than Great Britain, and now has to oppose these dangers with 35 per cent. and not 100 per cent. sea strength."

The implication here that a large Russian submarine force obliges

the creation of an equally large one by Germany is not based on a logical view of naval operations, but the Russian strength has been frequently cited for purposes of propaganda. In the absence of authoritative information, it is not easy to determine the actual strength of Russia in submarines. *The Times* correspondent, at Riga, writing on June 27, 1938, said :—

“ Determined efforts to build new submarines were made in 1933 and 1934. It is now known that a great number of these craft of small tonnage were constructed in series, not only at the Leningrad yards. Then larger submarines of 1,000 to 1,500 tons were begun. These were designed for long and distant service, and most of them have since been stationed at the new ice-free naval base of Murmansk, in the far North. Last year the Soviet authorities claimed, without giving any particulars, that the submarines of this Northern Fleet had broken the world record for long and distant service. This year a Soviet submarine reached the coast of Greenland in connection with the expedition to rescue the Papanin group of Arctic explorers. Altogether there are between 30 and 40 submarines at the Murmansk base.

Somewhat about the same numbers are believed to be in the Black Sea and at Vladivostok. A total of 160 submarines, however, would make Russia far and away the strongest submarine Power in the world, whereas this is a distinction claimed by Signor Mussolini for Italy. Addressing the Senate, on March 30, 1938, he is reported to have said :—

“ Italy has to-day the most powerful submarine fleet in the world. We have outdistanced everyone, and it will be very difficult, if not impossible, to catch up with us.”

The number of Italian submarines, built and building, increased during 1938 from 106 to 124. At the Naval Review in the Gulf of Naples on May 5, 1938, in honour of the visit of Herr Hitler, a spectacular feat was the simultaneous diving of 90 submarines. Italy's aim has been stated unofficially to be a strength of 170 submarines by 1941. This would be the highest ever attained by any Power in peace time. The United States, as a result of her War programmes, had 122 submarines in 1928–29, but the highest total belonging to any European Power was 100 in France in 1935.

From the foregoing survey and from the tables of effective fighting ships in the Reference Section it will be seen that Great Britain is particularly strong in those larger classes of ships which, in conjunction with proper quotas of smaller vessels and aircraft, are still the main instrument of sea power. She is greatly superior in battleships and large aircraft-carriers, less so in cruisers, she has a medium strength in destroyers, and is inferior only in submarines. The soundness of her policy in maintaining an adequate strength in the more powerful units has been endorsed by the consensus of naval opinion all over the world. Faith in the capital ship as the main arbiter of naval warfare has been revived by the events of the past four years. Among those who subscribe to this view is Signor Mussolini, who, speaking before the Senate on March 30, 1938, is reported to have said :—

“ Land war is facilitated or otherwise by the greater or less degree of command of the sea which is possessed. The post-war argument between those who uphold battleships and those who favour a large number of small craft is finished. It may be that battleships are not enough to form a navy, but it is still more certain that you cannot form a navy with a cloud of small craft.”

G. H. H.

CHAPTER IV.

THE BRITISH MARITIME INDUSTRIES:

A NATIONAL PROBLEM.

AN island community, especially one which is the pivot of an Empire which comprises nearly one-sixth of the land surface of the earth and is distributed over the Seven Seas, needs two navies—one of defence and another of supply—both of which must be supported by adequate facilities for building, equipment, docking, and repair. It is also necessary that there should be sufficient trained men to man the men-of-war and the merchant ships, as well as the shipyards, engine shops, and other establishments ashore. Adequate reserves of ships, of both war and peace, and of personnel, to make good the losses of war, are also desirable, if not essential.

Those principles should be regarded in this country as axiomatic. They were so regarded in the past. Before the Great War the Royal Navy was maintained in accordance with the Two-Power Standard, and private enterprise, in a fair field of competition, came to own more than half (50·2 per cent.) of the merchant shipping under all flags; the shipyards were responsible for the construction of 81·6 per cent. of the new mercantile vessels sent afloat on the world's seas from year to year,* besides building all the men-of-war of the Royal Navy and many men-of-war for other countries.

Those were halcyon days when the strength of the Merchant Navy and adequacy of the shipbuilding industry could be taken for granted, and the only anxiety that arose was as to the sufficiency and efficiency of the Royal Navy. A series of naval crises occurred at intervals during the latter half of the nineteenth century and in the early years of the present century. In spite of all political and financial influences, the Royal Navy was, however, maintained in strength, and in every emergency from the time of the Crimean War onwards it was supported by a great volume of merchant tonnage, to which it gave effective protection; while both navies had behind them large and well-equipped and well-manned establishments for building and repairing the ships of both fleets.

Soon after the opening of the Great War, the submarine appeared, and in spite of all the efforts of the Royal Navy and its vast auxiliary forces, nearly 7,500,000 tons of merchant shipping were destroyed by the enemy by gun, mine, and torpedo, and 14,000 seamen on board British ships, which were not designed and built for the contest of violence, lost their lives. The final issue on which victory

* Board of Trade inquiry into Shipping and Shipbuilding after the War. 1918.

or defeat turned was not the ability of the Royal Navy to fulfil its historical mission or the competency of the Army or Air Force, but the capacity of the shipbuilding industry, with its ancillary industries for the supply of engines and equipment, to make good the destruction of mercantile tonnage at sea. So desperate did the struggle at last become that the co-operation of the United States and Japan was enlisted ; but the shipbuilders and marine engineers of Great Britain and Northern Ireland mobilised their resources so successfully that their output at length exceeded the toll which the enemy was exacting ; not until after the Armistice were any considerable reinforcements of merchant ships completed by the Americans and Japanese.

The major lesson of the Great War was that, in the last analysis, it was won by merchant shipping and shipbuilding, defended, of course, by the Royal Navy, for from first to last there was no serious danger of invasion ; the military forces engaged in the various theatres overseas were kept supplied with all that they required ; and the mastering of the submarine, employed for the first time in accordance with the " sink at sight " theory, proved only a matter of time.

Ministers of the Crown and members of the Houses of Parliament, as well as the man in the street, failed to realise the extent to which victory had been achieved by the two complementary fleets. In foreign countries, on the other hand, it was recognised that a supreme vindication of their essential functions and their interdependence had been provided. In the United States, in Japan, in France, in Italy, and subsequently in Germany, as well as other countries, the various Governments adopted policies designed to increase the volume of merchant tonnage which would be available in time of war, while at the same time the building of men-of-war, especially cruisers and light-draft ships, was resumed.

In this country, the unilateral movement for naval disarmament, the greatest idealist adventure on which the British peoples had ever entered, was endorsed by public opinion ; and complete indifference was shown to the efforts of foreign Governments to build up their merchant fleets by a variety of uneconomic expedients, such as subsidies and various forms of flag discrimination.

When at last an awakening occurred, it was only partial. The British Government decided in 1936, as part of its rearmament programme, to restore the Royal Navy to a strength appropriate to its responsibilities in the two hemispheres ; but it ignored the extent to which the Merchant Navy had suffered in the economic war which had been waged against it for nearly twenty years, at an expenditure out of the budgets of foreign exchequers of about £1,000,000,000, and the influence which the absence of Admiralty orders and the falling off of mercantile work had had on the shipbuilding industry.

SHIPS.

There is one book of reference which is studied by Ministers and others in foreign countries but is unfamiliar to British Ministers.

TABLE I.—STEAM AND MOTOR TONNAGE, 1914 AND 1938.

Countries.	1914.		1938.		Difference between 1938 and 1914.		
	No.	Gross Tons.	No.	Gross Tons.	No.	Gross Tons.	Tonnage per cent.
Great Britain and Ireland	8,587	18,892,089	6,843	17,675,404	-1,744	-1,216,685	- 6.4
British Dominions, Colonies, etc.	1,536	1,631,617	2,218	3,043,686	+ 682	+1,412,069	+ 86.5
British Empire Total	10,123	20,523,706	9,061	20,719,090	-1,062	+ 195,384	+ 1.0
Denmark	576	770,430	694	1,129,556	+ 118	+ 359,126	+ 46.6
France	1,025	1,922,286	1,246	2,890,783	+ 221	+ 958,497	+ 49.9
Germany	2,090	5,134,720	2,321	4,231,657	+ 231	+ 903,063	+ 17.6
Greece	407	820,861	638	1,889,269	+ 231	+ 1,068,408	+ 130.2
Holland	709	1,471,710	1,473	2,852,012	+ 764	+ 1,380,302	+ 93.8
Italy	637	1,430,475	1,156	3,258,992	+ 519	+ 1,828,517	+ 127.8
Japan	1,103	1,708,386	2,187	5,006,712	+1,084	+ 3,298,326	+ 193.1
Norway	1,656	1,957,353	1,963	4,613,175	+ 307	+ 2,655,822	+ 135.7
Spain	589	883,926	793	947,963	+ 204	+ 64,037	+ 7.2
Sweden	1,088	1,015,364	1,239	1,571,054	+ 151	+ 555,690	+ 54.7
United States: Sea	1,113	2,026,908	2,338	8,936,465	+1,225	+ 6,909,557	+ 340.9
United States: Lakes	579	2,260,441	519	2,467,430	- 60	+ 206,989	+ 9.2
Other Countries	2,749	3,477,311	3,781	6,365,993	+1,032	+ 2,888,682	+ 83.1
World Total	24,444	45,403,877	29,409	66,870,151	+4,965	+21,466,274	+ 47.3

Lloyd's Register is the authority, recognised all over the world, on the strength of the merchant navies of the world, and the volume for 1938-39 reveals the dramatic change, to the disadvantage of this country, in the balance of commercial sea power which has occurred since 1914—testimony to the appreciation by foreign countries of the importance of shipping under conditions of war as well as of peace.

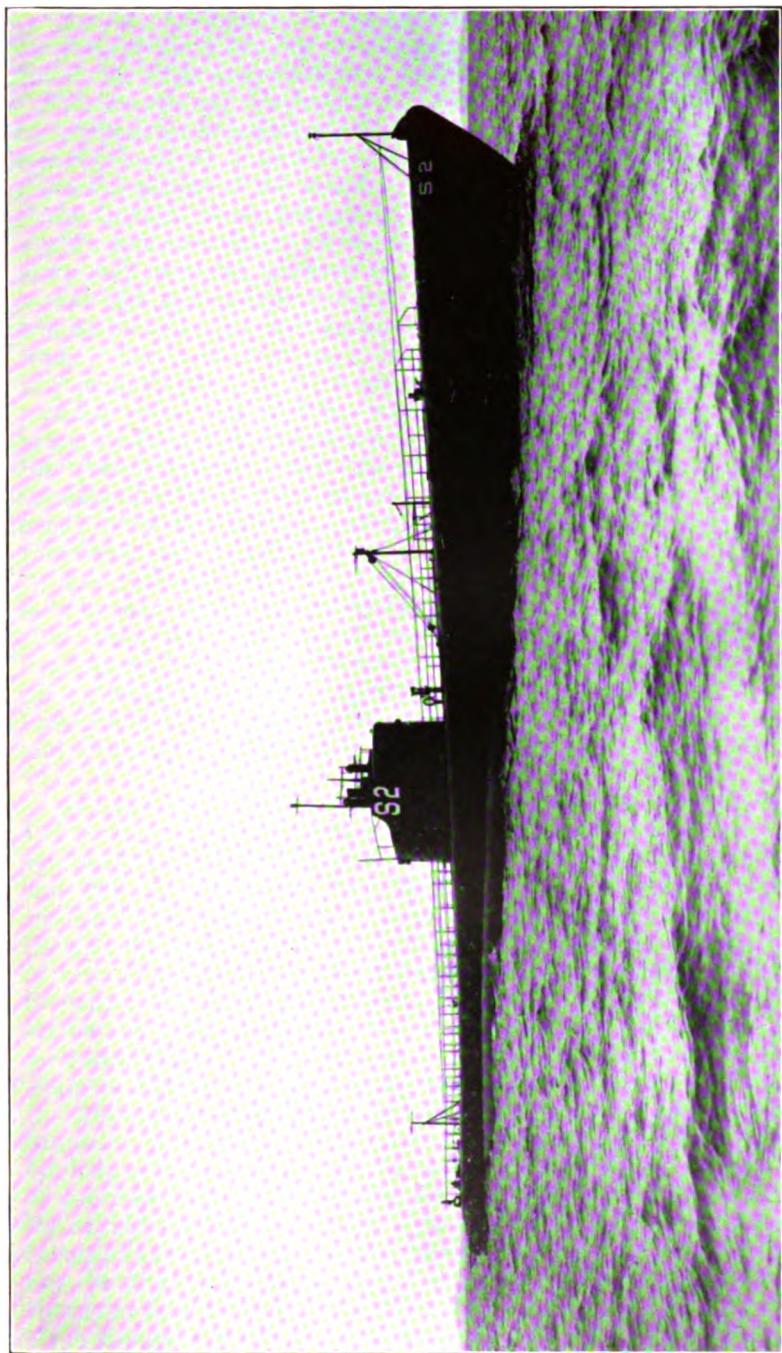
Table I shows, first, that from June, 1914, to June, 1938, the net increase in the world's steam and motor tonnage was 21,466,274 tons, equal to 47·3 per cent., and that the net addition to the number of vessels was 4,965. Those figures stand as a record of the increase of the world's merchant fleets. Secondly, it reveals that there has been a net decrease in the tonnage belonging to Great Britain and Ireland of 1,216,685 tons, or 6·4 per cent., while the number of ships has decreased by 1,744 during the same period. In the British Dominions, Colonies, etc., there has been an increase of 1,412,069 tons (86·5 per cent.) and 682 vessels, but for the most part these vessels, even those suitable for the ocean trades, would not be available in an emergency for the carriage of cargoes to and from the British Isles. Moreover, the British total of 17,675,404 includes 470 steam or motor oil tankers of upwards of 3,000,000 tons gross which could not be used for the carriage of ordinary cargoes. In a sentence, foreign tonnage has increased in this period by 85 per cent., while that under the British flag has decreased by 6·4 per cent.

During this period the largest increases took place in the United States (apart from shipping engaged on the Great Lakes), 6,909,557 tons; Japan, 3,298,326 tons; Norway, 2,655,822 tons; Italy, 1,828,517 tons; Holland, 1,380,302 tons; Greece, 1,068,408 tons; and France, 958,497 tons. The only decrease, other than in Great Britain and Ireland, was in the case of Germany, where the present total tonnage is still 903,063 tons below that for June, 1914.

The present century has witnessed unprecedented development in the mercantile fleets of the world, the steam and motor tonnage having increased from 24,009,000 tons in 1901 to 66,870,000 tons in 1938, and the balance of commercial sea power has undergone a dramatic change, as Table II reveals.

TABLE II.—PERCENTAGE OF TONNAGE OWNED IN THE WORLD.

	1901.	1914.	1938.
Great Britain and Ireland	50·2	41·6	26·4
United States (Sea-going)	4·2	4·5	13·4
Japan	2·2	3·8	7·5
Norway	3·4	4·3	6·9
Germany	10·1	11·3	6·3
Italy	2·7	3·1	4·9
France	4·4	4·2	4·3
Holland	2·1	3·2	4·3



UNITED STATES SUBMARINE SEAL.
(Official U.S. Navy Photograph, by courtesy of the Navy Department.)

Mr. W. A. Souter, in his presidential address at the annual meeting of the Chamber of Shipping of the United Kingdom, on March 31, 1938, suggested that a volume might be written entitled "The Growth and Decline of the British Mercantile Marine." As he recalled, for two generations before the Great War, Great Britain steadily built up a position amongst the maritime nations as the great sea carrier of the world. Starting from the year 1840, when Great Britain owned 2.9 million tons gross, or 30 per cent. of the world's tonnage, nearly all sail at that date, she gradually acquired more and more the mastery of the seas until, in June, 1914, she owned 18.9 million tons gross, or 41.6 per cent. of the world's steam and motor sea-going tonnage, and carried about half of the world's trade. The position is very different to-day. We now own only 17.7 million tons, or 26.4 per cent. of the tonnage afloat. In contrast with this decline, tonnage owned abroad has steadily increased from 26.5 million tons in 1914 to 49.2 million tons to-day. But the vital point is that the effective United Kingdom tonnage available for the carriage of food, raw materials, and troops in the event of war—omitting sailing ships, tankers and non-trading vessels—is only 14 million tons.

The decline in numbers of vessels owned in the United Kingdom is even more striking than the decline in total tonnage. In June, 1914, there were 8,587 steam and motor vessels under the British flag, but in June, 1938, this number had fallen to 6,843. If tankers are excluded from this comparison, the inescapable fact is that we have about 2,000 fewer vessels suited for the carriage of passengers and ordinary produce than we had at the outbreak of the last war.

It has been suggested that the modern ship is so much larger and carries so much more cargo than the vessels of twenty-five years ago that the decrease in numbers is a matter of little importance and that, in any event, any deficiency could in time of war be made good by chartering neutral ships. But we need more tonnage than we did and not less. Owing to the development, in particular, of inter-Imperial trade, the distances over which cargoes have to be carried are much longer than they were. As an extreme illustration of this development, we import more sugar, including molasses, than we did, and such cargoes are ocean-borne for a distance not of 2,000 miles, as was the case, but of 6,000 miles. In consequence of the decline of our trade with the near Continental countries, the haul for most of our imports, including foodstuffs, is far longer than it was, with the result that owing to the increase of our population the need for ships is greater than it was, while the supply available is smaller. The decline in numbers is important because every unit sunk by an enemy would, by reason of its larger size, be of greater consequence; an enemy does not sink so many thousand tons but so many ships, and the smaller the number of ships the greater the proportionate loss. The longer voyages and the greater demand have, in short, cancelled out the increase in size and speed of British merchant ships.

As to the plea that neutral tonnage could be chartered to make

good any deficiency in British tonnage, the conditions are not so favourable as in the Great War, as so much neutral shipping relies on oil fuel and not on coal, which was the magnet which the Ministry of Shipping was able to employ in order to secure control over neutral ships. Moreover, it is possible that an enemy might state that he would regard the grant of charters to this country as an unneutral act, and in that event, even if the claim were untenable in law, the country under whose flag the tonnage operated might, as an insurance against trouble, prohibit its shipowners from placing ships at our disposal. This is not a possibility to be lightly dismissed, and it reinforces all the arguments against placing reliance upon foreign tonnage in time of war, apart from the national humiliation which such a policy by the world's greatest sea power would represent in the eyes of the world, and the consequent injury to this country's prestige.

But if neutral tonnage could be chartered, would it, on the long view, be a wise procedure—wiser than ourselves providing all the shipping required to meet our needs in an emergency? What was the effect of the chartering of such ships during the Great War? That aspect of the matter was dealt with by Mr. H. M. Cleminson, general manager of the Chamber of Shipping of the United Kingdom, in an address to the Royal Empire Society on November 22.

While enemy tonnage was largely lost or immobilised, owners of neutral tonnage were in a position to make unexampled profits. British shipping, on the other hand, was the most strictly controlled in its operations, the least well paid and most heavily taxed of all—allied or neutral. Thus, where the British Government paid for British requisitioned tonnage 12s. 6d. a ton d.w., it paid for neutral tonnage 25s. to 35s. a ton d.w. per month, and open market rates obtained by neutrals and allies reached as much as 100s. per ton d.w.

The British Government paid for neutral tonnage up to 225s. per ton for grain from the Plate; that is over £11 per ton of cargo, equal to £17 per gross registered (ship) ton or, for the one voyage, double the pre-war cost of a new ship or four times the average pre-war capital value for each voyage; and the neutral ship could make, if spared, three such voyages a year.

What, in the meantime, was happening to British shipping?

Of the margin between the smaller receipts of British owners and their expenditure the Government took up to 80 per cent. by way of Excess Profits Duty and one-quarter of what remained for Income Tax. No comparable taxation was imposed upon either allied or neutral tonnage, yet to replace their lost tonnage British owners out of their far smaller resources were compelled to pay the excessive prices for tonnage that a world market created. For example, the price paid to H.M. Government (which during the later years of the war had monopolised ship-building) for the 1,400,000 d.w. tons of merchant ships sold in 1919 was £33,000,000 or £23 per ton. Its value fell to £13 per ton by December, 1921, and a year later to £9. Such depreciation could not be met without crippling raids on the relatively low reserves which British owners had been permitted to make.

The beginning of all the troubles of British shipping in the post-War years is, in large degree, to be found in the chartering of neutral tonnage during the intense phase of the submarine campaign. These foreign shipowners accumulated large reserves which, in some instances, with the further aid of their Governments in providing operational subsidies, enabled them to build newer and more efficient ships and to expand their fleets.

SEAMEN.

Partly owing to the decrease in the number of British ships and partly owing to the smaller crews carried in modern vessels, the man power available for the Merchant Navy has shrunk. Between 1911 and 1937 the number of merchant seamen fell by 47,000, almost wholly accounted for by deck and engine room ratings.

In reply to a question in the House of Commons on November 29, the President of the Board of Trade gave the following figures as representing the number of masters and officers employed on sea-going vessels registered in the United Kingdom, including the Isle of Man and the Channel Islands on the dates given. The percentages of reduction have been added.

	April 3, 1911.	June 15, 1936.	Decline Per Cent.
Masters	7,908	3,796	52
Deck and Navigating Officers	12,268	8,191	33
Ship's Engineers	17,301	13,786	20
Total	37,477	25,773	31

The decline in the personnel of the British Mercantile Marine is still continuing, and is likely to continue, since, though British seamen are better paid than those of any other leading maritime country, shipowners, exposed on the one hand to the adverse influences of foreign subsidies and on the other to the competition of the Admiralty, War Office, and Air Ministry, as well as to that of employers in the protected industries, cannot offer such conditions as will tempt lads on leaving school to go to sea in their ships, with no assurance of continued employment in times of depression and no prospect of a pension at the end of their careers. Shipowners, in competition with shipping carrying lower-paid crews, have gone already beyond the economic limit in pay and general conditions of employment.

SHIPBUILDING.

In any event, the shipbuilding industry must have suffered owing to the decline of the British Merchant Navy, but if the Admiralty had not been called upon to acquiesce in the policy of unilateral disarmament and had continued to place orders for men-of-war, a large measure of employment could have been provided during the shipping depression of 1930-36 in the larger yards, which are equipped for the building of such vessels. But from the end of the Great War down to the adoption of the rearmament programme, no heavily armoured ships, except the battleships Nelson and Rodney, were laid down, and the number of cruisers and auxiliary craft for which contracts were placed was small. The absence of naval orders coincided with the increasing embarrass-

ment of British shipowners owing to the intensity of foreign competition on the trade routes, with the result that they were in no position to place as many contracts as they had done in the past. Nor was this all. Many foreign customers of former days no longer came to British shipyards for new mercantile tonnage, while foreign Governments, which had been in the habit of building men-of-war in this country, either provided facilities themselves or, under barter or other arrangements, contracted with other countries for their men-of-war. This combination of adverse circumstances conspired to depress the shipbuilding and marine engineering industries in this country. The decline of these twin industries, reacting on all the ancillary trades concerned with ship equipment, as well as the production of steel, is shown in Table III.

TABLE III.—DECLINE OF SHIPBUILDING IN GREAT BRITAIN AND NORTHERN IRELAND IN RELATION TO WORLD CONSTRUCTION.

Year.	British Percentage.
1892-94	81·6
1895-98	73·5
1899-1903	59·9
1904-08	59·7
1909-13	61·1
(1914-20 Production abnormal owing to the Great War)	
1922	41·8
1923	39·3
1924	64·0
1925	49·5
1926	38·2
1927	53·6
1928	53·6
1929	54·5
1930	51·2
1931	31·1
1932	25·8
1933	27·2
1934	47·5
1935	38·3
1936	40·4
1937	34·2
1938	34·1

Apart from the effect of the decline of the strength of the Royal Navy and the Merchant Navy, and the loss of orders from foreign countries, shipbuilding and marine engineering have been the victims of this country's new economic policy—the tariff, the subsidies given to selected industries, and the quotas introduced for the encouragement of home and Empire production. The traditional Free Trade policy was that this country should buy all it required in the cheapest markets and sell all it had to spare in the dearest markets, being assured of efficient, safe, and cheap transport by the Royal Navy and the Merchant Navy. When that policy became untenable on broad national grounds, all the maritime industries were handicapped. In the industries sheltered from foreign competition wages were increased, hours of labour reduced, and the general conditions of work improved. Other industries still exposed to the full blast of uneconomic foreign competition,

such as shipbuilding and marine engineering, had to make their contributions to the higher taxation which was the result of the new economic policy, and had also to concede increases in wages and agree to the shortening of the hours of work, and the betterment of labour conditions generally. As the standard of living in other industries was raised, shipbuilders and marine engineering firms had to keep pace with the movement if they were to retain their labour in face of the attractions of sheltered industries, while at the same time, owing to the influence of the rearmament movement, all their materials, finished and semi-finished, became more expensive. Consequently shipowners, also exposed to unrestricted and in many cases highly subsidised foreign competition, were unable to build ships at the higher prices with any hope of operating them except at a loss.

Thus the shipbuilders of Great Britain and Northern Ireland stand defeated—first, by the favour shown by the National Government, by means of the tariff, subsidies and import quotas, to a variety of non-essential industries, and, secondly, by the various uneconomic expedients adopted on the European continent, as well as in Japan and the United States to encourage shipbuilding. Ships cannot be constructed in our shipyards because the cost is from 40 to 50 per cent. greater than it was two years ago, when prices were still at the uneconomic levels which represented serious loss to shipbuilders, machinery makers, steelmakers, and all the supplying industries. It has been stated by British shipbuilders that (i) of the increase in shipbuilding costs in the United Kingdom which took place since 1932–35 (the depression level) 17 per cent. was required to bring the shipbuilding prices up to a bare economic level for the shipbuilding and supplying industries, and (ii) the balance represents the increase due to the rearmament demand and the general rise in prices. As an illustration of the impasse which has arisen, there is the lightning visit of Sir Edward Beatty, president and chairman of the Canadian Pacific Railway Company, whose trains and ships encircle the globe. He came to this country to order, in association with Lord Craigmyle, two passenger liners which were to maintain, with the aid of subsidies towards their operating cost from the Governments of the United Kingdom, Canada, Australia, New Zealand and Fiji, the All-Red Route across the Pacific Ocean. He was soon satisfied that ships built at prices which had to be asked by the prospective builders could not be made to pay. He stated on leaving that everything was in order—except the shipbuilding price. As that was so high, the construction of the two ships would have to be postponed. So the Americans will still go on operating their subsidised service across the Pacific to the injury of British prestige and trade. It is much the same on other trade routes. In many cases designs have been pigeon-holed, and in others British owners have placed orders, said to be of the value of £7,000,000, in Continental yards, because only at the lower prices is there any hope that a profit can be made on the vessels in competition with more favourably situated foreign tonnage. Foreign owners, who have been coming to this country

for many years with contracts, have also, as has been stated, been tempted from their old allegiance.*

THE STATE OF AFFAIRS TO-DAY.

The decline in the maritime industries represents the most serious danger to which this country is exposed, since without merchant ships the fighting forces cannot fight, the civil population cannot live and the Empire continue to exist.

Geographic conditions led our forefathers to adopt a maritime policy. They developed manufacturing industries on a large scale, which led to the employment of so many workers that the soil of this country could not supply them with food in sufficient quantity. Thus, without subsidy, private enterprise provided ships, first, to bring in the essential cargoes of raw materials in which this country is deficient, and of food grown cheaply overseas on virgin soil, and secondly, to take to the markets of the world the surplus manufactures as well as coal. In the process of time these merchant ships, owing to efficient management, carried a great deal of trade between foreign countries and furnished invisible exports in the form of freights. It was an ideal system of exchange, on which the country grew rich, saving many millions each year which were invested abroad and yielded high dividends, which also figured as invisible exports in the national trading account.

So long as foreign countries were prepared to recognise this system of more or less unrestricted exchange of goods and services, all was well for everyone in this country. The food of the workers in the great industrial areas, grown on virgin soil overseas and carried by the most economic form of transport, was cheap, with the result that wages were low and coal and manufactures could be sold to foreign customers at tempting prices. But after the Great War, when unemployment reached high figures almost everywhere, higher tariffs were enacted in most foreign countries, exchanges were disturbed, and other unfavourable trading conditions occurred, with the result that Free Trade, the sheet anchor of the maritime industries, had to be abandoned.

Thus every development in this country and abroad has contributed to injure the maritime industries. Shipping and ship-building have steadily declined during the past twenty years and are now languishing. As the Merchant Navy shrinks, the establishments which supply and equip new ships must suffer, and as the output capacity of the shipyards declines, the Royal Navy must be handicapped in time of emergency, both as to the construction and the repair of men-of-war. During the Great War, when the Royal Navy had the advantage of a great superiority of strength over the enemy, the shipyards were required to provide men-of-war of 2,000,000 tons displacement besides carrying out thousands of repair jobs. That triumph could not be repeated in any future war—for want of the necessary plant and skilled workmen. Nor could the Merchant Navy perform the miracle of supply, in face

* "The Nineteenth Century and After." October, 1938.

of the enemy's most desperate tactics, of the years 1914-18, since it has 2,000 fewer ships capable of carrying food and raw materials, and a personnel smaller by about 70,000 officers and men, while this country's most essential supplies, now obtained to a greater extent than before from the overseas Empire instead of the countries of Europe, have to be brought longer distances.

ARCHIBALD HURD.

CHAPTER V.

CRUISERS.

ANYONE who examines our cruiser construction since the War cannot fail to be struck by its irregularity and by the apparent lack of a consistent policy in the matter of size. There has been nothing that can be recognised as an orderly process of evolution. Tonnages have jumped about in a most disconcerting manner, now up, now down, with an absence of system that allows the size of any particular class of ship to provide no clue to that of the next.

The first of the post-War cruiser classes was the "County" class, of 10,000 tons. Then came a drop of 2,000 to the York and Exeter, of 8,000 tons. The next two classes showed the same downward movement, the "Leanders" being of 7,000 tons and the "Arethusas" a further 2,000 tons down on the "Leanders." This gradual descent to the 5,000-ton mark was followed by an abrupt rise to 9,000 tons in the "Southamptons," going on to 10,000 in the two "Edinburghs"; only, however, to be succeeded by a violent zig-zag, a steep decline being made to 5,500 tons in the "Didos," followed by an almost equally sharp reaction to 8,000 tons in the "Fiji" class.

Cruiser tonnages that have covered such a wide range and evinced so oscillating a character can provide the student with little guidance regarding the ideal requirements of the cruiser class and must leave him unenlightened as to whether one particular tonnage is more suitable than another; or whether, perhaps, it is better to have more than one class of cruiser, a large type and a small type, or even possibly three or more types of differing dimensions.

If the answers to such questions as these are not to be found in our cruiser construction over the last twenty years, the uncertainty attending them is not confined to the post-War period. Fifty or more years ago, much the same problems were being debated. In the seventies of the last century the fleet was finally casting off its old canvas raiment and was emerging as the purely mechanical Navy that we know to-day. In the process, a number of problems incidental to the transition from sail and wood to steam and steel presented themselves for consideration, among them the characteristics to be given to the new ships, including, of course, the cruisers. The old designations of frigate and corvette were on the point of dying out with the wooden ships, and the term "cruiser" was coming into use as the type name for the unarmoured ships of the scouting classes. With the greatly enlarged possibilities that iron and steel construction introduced, the question of the right size for these cruisers naturally arose.



H.M. CRUISER LIVERPOOL.
Commissioned for service, December, 1938.
(By courtesy of the builders, Fairfield Shipbuilding Co., Ltd.)

The subject aroused considerable discussion, in which naval officers, constructors, members of Parliament, and various civilians took part. Figuring prominently in this discussion was the *Inconstant*, a (for that time) large cruiser of 5,300 tons which the Admiralty had had built as an "answer" to reports of new and powerful corvettes building for the United States Navy. This was in line with the Admiralty's favourite policy of "going one better" than foreign construction, a policy that had been put into words by the Committee on the Design of Warships of 1871, when it said that, "a simple and perhaps, under ordinary circumstances, a safe method by which the requirements of the British Navy may from time to time be estimated is to watch carefully the progress of other nations in designing and constructing ships of war, and to take care that our own fleet shall be more than equal both in the number and power of its ships to that actually at the disposal of any other Power."

It was in pursuance of this principle that the *Inconstant* had been built to meet or surpass the American "Wampanoag" class, about the reputed virtues of which our own Admiralty had become somewhat exercised. As it turned out, the fears of the Board were mainly unnecessary, for these American ships were very largely failures. The *Inconstant*, on the other hand, was a very satisfactory vessel.

The question was, Should we go on building "Inconstants" as the standard cruiser size? Opinion was divided. Admiral Scott and Sir E. J. Reed, her designer, were in favour of the *Inconstant*. The younger school, however, showed support for the policy of smaller ships and more of them. This was the view of Captain Waddilove, who had actually commanded the *Inconstant*. "I think," he said, "that double the number of 'Volages' (3,000 tons) would be a better provision for the protection of our commerce than half the number of 'Inconstants.'" Lieutenant Eardley-Wilmot, in an essay which is stated to have been highly approved by the Council of the United Service Institution, also expressed himself in favour of numbers rather than size. Mr. Barnaby, the eminent naval constructor, was in favour of "moderate dimensions for unarmoured ships." So, too, was Mr. (afterwards Lord) Brassey. "I observe with satisfaction," he said at the Institute of Naval Architects in 1876, "that the programme of the Admiralty includes no ship so large as the *Inconstant*. The designers of that vessel were betrayed into an exaggeration of size from over-anxiety to combine in a single ship every quality with which an unarmoured vessel can possibly be endowed": a sentiment the latter part of which bears a remarkable resemblance to the criticisms of the post-War "County" class fifty years later.

Faced with the executive responsibility of choosing between large and small cruisers, the Admiralty made a characteristic decision. It adopted both of them. Or rather, it adhered to both of them; for official policy had for long been hesitant and uncertain on the subject of cruiser construction. The requirements were, indeed, conflicting. On the one hand, the protection of a world-wide com-

merce called for large numbers of protecting craft, which for economic reasons could only be provided in sufficient quantity if they were comparatively small. On the other hand, there was the frequently recurring challenge of the foreign construction of cruisers of a size greater than we should have wished to build for trade-protection purposes. In view of the consistent Admiralty belief that size in foreign ships could only be properly met by yet greater size in our own, it is not surprising to find our cruiser construction developing along two lines. One embraced what came to be known as 1st-class cruisers, built with one eye, if not both, on foreign construction. The other consisted of the lesser cruisers, with a more purely trade-protection and police function, and incapable of standing up to the large cruisers in the possession of other Powers. This smaller class was at times further divided into 2nd and 3rd-class cruisers, but this sub-classification was unreal. The true division was between ships that were built in direct answer to foreign competition and those that were not.

The differing factors governing these two broad classes of cruiser are reflected in their subsequent processes of development. The smaller class, being mainly independent of foreign shipbuilding stimuli, would have no specially compelling motive for constantly increasing size, and might therefore be expected to retain their original limited dimensions. This, generally speaking, was what happened. There would naturally be fluctuations due to special influences, such as the individual caprices of changing Sea Lords, while the common tendency of all classes of ship to grow larger with the passage of time would not be without its effect. On the whole, however, the tonnage graph of the smaller cruiser classes showed a marked stability right up to the outbreak of war in 1914. This can be seen from a list of the smaller cruisers from the early nineties onwards :

Number.	Class.	Launched.	Tonnage.
5	"Astraea"	1893	4,300
9	"Minerva"	1895	5,600
7	"Pelorus"	1897	2,000
1	"Vindictive" }	1897	5,700
3	"Hermes"	1898	5,600
1	"Challenger"	1902	5,900
4	"Diamond"	1903	3,000
2	"Sentinel"		2,900
2	"Pathfinder" }	1904	2,900
2	"Forward" }		2,800
2	"Adventure" }		2,700
2	"Boadicea"	1908	3,300
2	"Blanche"	1909	3,300
5	"Bristol" }	1909	4,800
4	"Weymouth"	1910	5,200
3	"Amphion"	1911	3,400
3	"Chatham"	1912	5,400
3	"Nottingham"	1913	5,400
8	"Arethusa"	1914	3,500
8	"Calliope"	1914	3,800

If we make an exception of the "Pelorus" class, the above list shows 2nd-class (or light) cruiser tonnage to have oscillated between just about under 3,000 tons and just over 5,000. Twice did size creep up to the 5,000-odd ton levels, only to drop back again to round about 3,000 tons before starting on the upward climb again.

During the same period, the 1st-class cruisers were following a different path. True, they manifested some of the fluctuations and falterings of the small cruisers' journeyings; but there the resemblance ended. Owing to the competitive element in the 1st-class cruisers' composition, their progress was a steadily increasing one. In 1892 the largest cruisers we had were the six "Edgars" of 7,300 tons, mounting two 9·2-in. and ten 6-in. guns, with a 5-in. armoured deck. Four years later, tonnage jumped to almost double, when we built the 14,000-ton Powerful and Terrible as a reply to the Russian Rurik and Rossia of similar size. Tonnage then fell back slightly with the six "Diadems" of 11,000 tons in 1898. These ships were very large targets, but they had a broadside of only eight 6-in. guns, with a 4-in. armoured deck. They did not therefore show up very favourably with the "Edgars," of only two-thirds their size. After the "Diadems," tonnage again started upwards with the 12,000-ton "Cressys" and the 14,000-ton "Drakes," built at the turn of the century. They were the first British armoured cruisers, having a 6-in. side-armour belt, in addition to the armoured deck protection of the older 1st-class cruisers. Their armaments consisted of two 9·2-in. guns and a number of 6-in. guns, the "Cressys" having twelve and the "Drakes" sixteen.

The latter were, indeed, distinctly powerful ships, and were not so very much inferior to contemporary battleships. As compared with the "Duncan" class battleships of about the same date, they could show a broadside of two 9·2-in. and eight 6-in. against the Duncan's four 12-in. and six 6-in., while their side armour was only 1 in. less, though in armoured decks and general construction the battleships were undoubtedly a good deal the tougher vessels. Still, the general comparison was none too one-sided.

This narrowing of the margin of strength between the battleship and the cruiser led to the suggestion that armoured cruisers should now take their place in the main battle. The suggestion seems to have come in the first place from Sir William White, the Director of Naval Construction. In those pre-Naval Staff days, it was customary for the Directors of Naval Construction to take an active part in the discussions regarding the tactical use of the different classes of warship, quite apart from the technical considerations of their construction. It was therefore nothing out of the way to find Sir William White saying that :

"Hitherto the conception generally accepted has been that modern cruisers correspond to and take the duties of the frigates formerly serving with fleets. As scouts and attendants on the battleships, their place will no doubt be always fairly described in this manner, but whereas frigates in old days took no part in fleet actions, there seems no reason under modern conditions why first-class cruisers should hold aloof from fleet actions if designed and constructed suitably. This has become true largely through improvements in armour and armaments made in the last few years. . . .

"While there is no reason for supposing that the past policy of the Admiralty has been unwise in regard to cruiser construction, there is undoubtedly a necessity for a new departure in view of the improvements made in armour."

Though the precise intention embodied in this passage is slightly obscure, it may fairly be interpreted as meaning that Sir William thought that armoured cruisers could now, if necessary, play a part in engaging an enemy's capital ships. If so, this proposal of his would seem to show to what a dominating extent large cruiser development had been governed by mere competition in shipbuilding, to the exclusion of considerations of their tactical or functional employment. For if a cruiser is to be so powerfully built as to be capable of taking her place in the battleship action, it would surely be more sensible to go the whole hog and build her as a battleship; while if her true function is to act as a scout, there would seem to be no need to place her in rivalry to the capital ship. Confusion of object was beginning to creep in.

Sir William White's suggestion did not find acceptance at the time it was made. Indeed, in the next class of armoured cruisers there was a relapse from 14,000 tons to the 9,800 tons of the old "County" class. The upward movement was not, however, to be stayed, and the next four classes grew as follows :

Number.	Class.	Launched.	Tonnage.
6	"Hampshire"	1903	10,800
2	"Black Prince"	1904	13,500
4	"Warrior"	1905	13,500
3	"Defence"	1906	14,600

At this point the pace grew hotter. Sir John Fisher was at the Admiralty, and his motto was "Build few and build fast, each one better than the last." He now transformed the armoured cruiser into the battle-cruiser, and with the "Invincible" class, tonnage shot up to 17,200 at a bound. The "Invincibles" were followed in 1909 by the "New Zealand," 1,500 tons larger, and then there came an even mightier leap of 7,000 tons to the "Lions" of 26,000 tons, with the Tiger and Queen Mary of 27,000 tons two years later. First-class cruisers had quadrupled in size in twenty years.

Moreover, the suggestion of the Director of Naval Construction at the beginning of the century had at length materialised. First-class cruisers were now regarded as capable of taking an important part in the battleship action. Whether or not they were presumed to be incapable of performing their scouting rôle does not seem to have been very exhaustively considered. It is significant, however, that with the metamorphosis of armoured into battle cruisers, the volume of light-cruiser construction sensibly increased.

Then came the War, and as a testing time for the claims of the different types of cruisers it came at a singularly opportune moment. For the fleets that fought the war of 1914-18 contained all the different gradations through which the cruiser had been evolving during the previous generation—light cruisers, armoured cruisers,

and battle-cruisers. Had the War come ten years earlier, the battle-cruisers would have been absent. Had it been delayed for ten years, the armoured cruisers might possibly have died out. As it was, the conditions could not have been more favourable for a thorough-going trial of the various theories of cruiser construction.

What verdict did the practical test of the War pronounce on these theories and on the differing cruiser types which were their visible expression? Let us take the armoured cruiser first, for it is about this type that the evidence of the War is the least ambiguous. Nothing could be clearer than the unfavourable verdict that it passed on the armoured cruiser class. From the very commencement of the War misfortunes crowded thick upon them. In September 1914 came the sinking of the Hogue, Cressy, and Aboukir by submarine. Two months later the Good Hope and Monmouth were sunk at Coronel. In October, 1915, the Argyll went ashore and became a total wreck, and in December the Natal blew up at Invergordon.

The evidence at Jutland is in the same direction. The armoured cruisers were spread ahead of the Grand Fleet, the 1st Cruiser Squadron to starboard and the 2nd Cruiser Squadron to port. To the 1st Squadron the battle brought disaster and almost total annihilation. Almost before the main fleets had met, the Defence had blown up and the Warrior had received such grievous wounds that she could only stagger away to sink the following day. The Black Prince, whose movements during the daylight action are unaccountably difficult to trace, ran into the High Seas Fleet during the night and was sunk with all hands. Of the whole squadron only the Duke of Edinburgh remained.

The 2nd Cruiser Squadron suffered no casualties, but it managed to get so far out of position on deployment that it took no effective part in the action at all, neither in the fighting nor in the reconnaissance work.

Eight days later the armoured cruisers experienced another heavy blow, when the Hampshire was sunk with Lord Kitchener on board.

On the German side the tale of misfortune was equally emphatic. On the outbreak of war Germany had possessed nine armoured cruisers. By the end of 1915 all but two had been sunk. And, moreover, they had been sunk without achieving any marked results. If the god of war had wished to go out of his way to indicate his disapproval of armoured cruisers, he could hardly have done it more pointedly.

In turning to the case of the battle-cruisers, we should do well to remind ourselves of the functions they were intended to fulfil. They had come into being in response to the theory that fast armoured cruisers, if made powerful enough, could play an important part in the main battleship action, actually engaging the capital ships of the enemy. In this respect they must be considered as battleships, and in that capacity are outside the scope of this chapter. As cruisers, however, they still retained the duty of scouting for the battle fleet and supplying it with information, though this aspect

of their rôle does not seem to have received much attention from Lord Fisher, with his passion for larger and larger guns.

How did the battle-cruisers fare in their scouting rôle at Jutland ? The answer is that they mostly failed. The British battle-cruisers were almost wholly occupied in fighting the German battle-cruisers, and this duel with their opposite numbers seems to have absorbed their attention so completely as to have rendered them incapable of paying any more than the most fragmentary heed to their reconnaissance duty. The German battle-cruisers, for their part, were no more successful. As scouts for the High Seas Fleet to report the arrival of the Grand Fleet battleships they failed completely. Taken all round, the value of the battle-cruisers as scouting craft in the action was remarkably small. The two squadrons were almost completely occupied with their own struggle.

If the judgment of Mars on the battle-cruiser was unenthusiastic, and was openly hostile to the armoured cruiser, it was much more friendly towards their smaller relation. Both in fleet work and in trade operations, the small cruiser showed up as well as the larger one showed up badly.

Taking commerce warfare, the 11,500-ton armoured cruisers *Scharnhorst* and *Gneisenau* sank practically no British shipping, whereas the 5,000-ton *Karlsruhe* and the 3,600-ton *Emden* accounted for about 70,000 tons each. It is, of course, the fact that the victory of Coronel produced a paralysis of British trade on the west coast of South America. But the *Emden's* exploits had a similarly disturbing effect in the Indian Ocean, while if the *Karlsruhe* had followed the *Emden's* methods of publicising her captures, she too would almost certainly have exerted a like influence. It is also true that both the *Emden* and the *Karlsruhe* eventually met their fate in the same way as the *Scharnhorst* and *Gneisenau*. Nevertheless, the material results the two former had achieved in the destruction of enemy trade were incomparably the greater.

The *Emden's* activities were put an end to, as will be remembered, by the *Sydney* ; and it is not uninteresting to note that, though her selection for the task may have been the purest accident, she was one of the two light cruisers among the Australian and New Zealand convoy escorts, which were otherwise composed of armoured cruisers.

In the Mediterranean the scouting exploits of the light cruisers Gloucester and Weymouth constituted the one bright spot in an otherwise sombre tale of opportunities lost by their battle-cruiser and armoured-cruiser consorts.

At Jutland, again, it was the light cruisers that did the only effective scouting. Not once but several times, both before and after the arrival of the Grand Fleet, Goodenough's 2nd Light Cruiser Squadron of 5,400-ton "*Southamptons*" went in and made contact with the High Seas Fleet, and reported its movements with a persistence and an accuracy far beyond what any of the heavier squadrons managed to achieve. His light cruisers did it, moreover, with surprising immunity. Although their unwelcome inquisitiveness brought them several times under heavy fire from the German battleships, they escaped with a lack of damage that stood in remark-

able contrast with the swift destruction that had attended the similar endeavours of Arbutnot's 1st Armoured Cruiser Squadron.

At the other end of the line, the 3,800-ton "Calliopes" were also keeping touch with the High Seas Fleet at a time when the British battle-cruisers and the 2nd Armoured Cruiser Squadron, though in the same area ahead of the battleships, were failing to do so. And, like the "Southamptons," the "Calliopes" did it without loss. Indeed, during the whole course of this battle, which took a heavy toll of British battle and armoured cruisers, not one single British light cruiser was lost.

It was not, of course, to be expected that the light cruisers, any more than other classes, would be able to go through the War without suffering losses. Even so, their vitality and power to withstand greater injuries than would have sufficed to finish off much larger warships were frequently quite astonishing. At Jutland the wretched 4,900-ton Wiesbaden suffered the successive bombardment of practically all the battleships of the Grand Fleet, and still remained afloat for a good many hours after her terrible hammering. Two months later it took no less than six and four torpedoes respectively to sink the 5,400-ton Nottingham and Falmouth.

By nearly every test, in fact, the War appears to point plainly to the light cruiser of between 3,000 and 6,000 tons as the most successful cruiser type. The case of the battle-cruiser is, of course, complicated by its dual rôle of part cruiser and part battleship. Judged as a cruiser, which is the purpose we are concerned with here, it cannot be said to have justified itself.

As between the light cruiser and the armoured cruiser there can certainly be no room for reasonable doubt. Both in point of useful service and of survival capacity, the former stands out just as clearly as Fortune's favourite as the latter does not. And this seemingly unequivocal judgment of Providence received the tacit acquiescence of one at least of the two chief contestants. In their wartime shipbuilding programmes the Germans made no attempt to replace their lost armoured cruisers, though they went on building light cruisers until the end of the War.

Nor is the evidence of the war of 1914-18 in conflict with the experience of previous periods. We had entered into the French Revolutionary and Napoleonic wars with no very clear division between the battleship and the frigate classes. Linking the two were a number of intermediate types. Thus, below the 74-gun line-of-battle ship there were to be found 64's, 60's, 56's, 50's, 44's, 38's, 36's, 32's, and 28's. Some of the smaller of these were frigates pure and simple, but the larger ones were intermediate vessels, part battleship and part frigate, and the line of demarcation between the two main types was nowhere clearly visible.

Under the practical test of war, nearly all the intermediate sizes began to disappear. The 38-gun frigate * came more and more to the front as the most successful "cruiser" type, and the classes between it and the 74 steadily declined. This 38-gun ship was a

* With the 38-gun must be bracketed the 36-gun frigate: the two developed practically hand in hand.

true frigate and well below the size that would earn the designation of intermediate ship. It was this latter type that the Napoleonic wars brought into disfavour, just as the Great War, a hundred years later, threw immediate doubt on the value of its lineal descendant, the armoured cruiser, while showing the same friendly countenance towards the light cruiser as had previously been displayed to the 38-gun frigate. Yet, strange to relate, no sooner did we receive this double endorsement of our pre-War policy of building smallish cruisers of between 3,000 and 6,000 tons than we proceeded to throw it over. Hardly had the waters of the North Sea closed over the shattered remains of the three armoured cruisers sunk at Jutland than we set about building the "Hawkins" class of 9,800 tons.

In doing so, we were obviously resurrecting the intermediate cruiser type, which the War was doing its best to destroy. It was a doubly unfortunate decision; for a year or two later came the Washington Conference for the limitation of naval armaments. And what should we do at this conference but use this very "Hawkins" class as the measure for standardising cruiser tonnage? We thus saddled ourselves and the rest of the world with cruisers of a size that everything showed to be too large.

For ourselves, the result was a large number of 10,000-ton cruisers of the "County" class. And it will hardly occasion surprise to say that these ships have been objects of instinctive misgiving to many naval officers ever since they were built. Many damaging criticisms have been levelled against them, among which has been the almost exact counterpart of the one we noticed as being made about the *Inconstant*, of an excessive endeavour "to combine in a single ship every quality with which an unarmoured vessel can possibly be endowed."

The initial and undiscerning choice of an oversize vessel as the standard size for our post-War cruisers may well be the cause of the uncertainties and vacillations that have marked our cruiser construction since. It seems, for one thing, to have caused confusion in our ways of thought about cruiser problems. As a symptom of this confusion, one may take the current habit of referring to the 10,000-ton "County" class as "trade route" cruisers. In bestowing this particular designation on these ships, post-War naval thought is running counter to all the experience of the past. In the old wars it was recognised that the primary requirement in regard to trade-route vessels was large numbers, and that this necessarily involved comparatively small size. It is true that these small but numerous vessels were often backed up in their various areas by a stiffening of larger ships, line-of-battle ships or heavy frigates of an intermediate type, or both. But these supporting vessels were relatively few. It was the smaller ships that formed the main bulk and substance of what could be called the trade-route vessels. We have already noticed Captain Waddilove saying, during the latter part of the nineteenth century, that "double the number of 'Volages' would be a better provision for the protection of our commerce than half the number of 'Inconstants.'" Brassey gave expression to the same principle when he wrote in 1882 that "it is

important to consider what types or classes of ships are the best adapted to protect our commerce, to keep open our communications with foreign settlements, and to convoy the supplies of food from abroad, which are indispensably necessary to the sustenance of our population. For such a service we do not want large or costly ships." The post-1918 practice of regarding the largest class of cruiser as the trade-route type is, in fact, a direct reversal of the time-honoured conception.

Uncertain though the position may be, however, the general trend of post-War construction seems nevertheless to indicate that cruisers may be in the process of separating off into the same two broad classes as existed before the War: namely, a small class of round about 5,000 tons and a larger class whose size is largely determined by foreign competition. The restrictions imposed by the post-War limitation treaties happen to confine the latter of these two classes to a tonnage of or below 10,000; otherwise there is every reason to think it would follow the same upward road as was taken by the 1st-class cruiser before the War.

Two questions, therefore, appear to arise. First, must we follow foreigners in building cruisers of an intermediate size that the War did its best to discredit? And secondly, remembering that pre-War light-cruiser tonnage varied between 5,000-odd tons and 8,000 tons, is there any reason to think that the upper limit of 5,000-odd tons (which is what we have at present for the smaller cruiser) must be best? In regard to this latter point, it may be useful to remember that the last-century opinion that we have referred to earlier was generally in favour of as small cruisers as possible. There was, however, in those days a practical low limit imposed by fuel endurance. The great drawback to the 3,000-ton *Volage* as a rival to the 5,000-ton *Inconstant* was her inadequate endurance under steam.

This defect of the small ship has now been considerably modified. The larger types of modern destroyer have nearly enough fuel capacity for all ordinary cruiser purposes. A slightly bigger class, say of 2,500 tons or thereabouts, should have ample. It is consequently arguable that such ships might be perfectly suitable for light-cruiser work, and as such preferable to the 5,000-ton vessel. And this proposition gains significance from the trend of cruiser and destroyer construction in certain foreign navies. France already has her flotilla-leader class of 2,500 tons. Italy is on the point of laying down a dozen "cruiser-destroyers" of 3,000 tons; and her construction of the more orthodox type of cruiser has noticeably fallen off in the last year or two.

These 3,000-ton "Esploratori" class are likely to be very useful ships. If we take the slightly smaller French "Mogador" class of 2,800 tons, we find that they mount a broadside of eight 5.5-in. guns, carry ten 22-in. torpedoes, with a speed of probably 40 knots. As compared with this our own "Leanders," which are of 7,000 tons and therefore two and a half times as large, do not seem to manifest correspondingly superior fighting qualities. For their broadside consists of eight 6-in. guns, they carry eight 21-in. torpedoes, and their

speed is only 32 knots. It is true that they have some patches of armour, carry an aircraft, and possess some more anti-aircraft guns. But are we confident that these "extras" make them, on the whole, two and a half times as powerful?

What, then, is this country's proper course? Should we accept the verdict of the last war as implying that cruisers of above about 5,500 tons are too large? If so, we ought to decline to allow competitive foreign competition to tempt us above that limit.

And if we do that, and adopt for ourselves the 5,500-ton mark as the practical upper limit for cruisers, must we then build up to or somewhere near it? Or should we take serious heed of the French and Italian examples and go as far below it as the essential requirements of the cruiser will allow? And on those notes of interrogation I propose to hand the matter over to the reader.

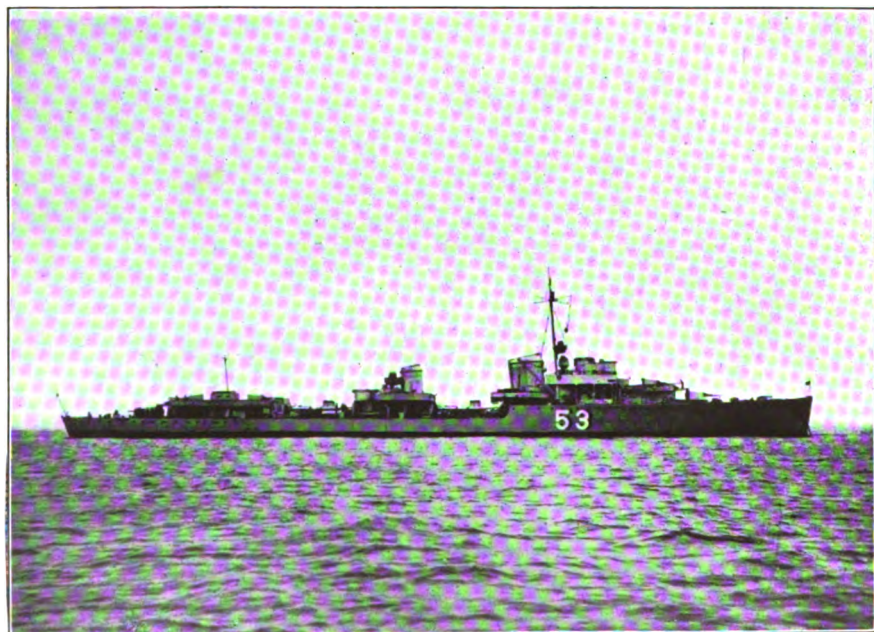
RUSSELL GRENFELL.



H.M. DESTROYER AFRIDI.

Commissioned for service, May, 1938.

(By courtesy of the builders, Messrs. Vickers-Armstrong.)



GERMAN DESTROYER HANS LÜDEMANN.

Completed 1938.

(By courtesy of the German Ministry of Marine.)

CHAPTER VI.

COMMAND OF THE SEA.

For nearly fifty years—ever since Mahan and Colomb started to lay its foundations—naval theory has based itself upon the necessity of gaining “command of the sea.” That idea has been so universally accepted, its sway so absolute for so many years that, like all dogmas too long unopposed, it has tended to develop into an unthinkingly repeated creed, professed without any clear understanding either of its purpose or its implications. The vehement and unexpected challenge which it has found in recent years can, therefore, claim at least this merit that it has made us realise how imperfect our appreciation of this fundamental element of naval strategy still is, how urgent the need for a closer examination than it has hitherto received and how vital the issues involved in its proper understanding.

If we wish to understand what Mahan himself meant by his emphasis upon the necessity of acquiring “command” we shall do better not to turn to his well known great historical works, but to those lesser studies which, almost completely forgotten to-day, offer an infinitely more illuminating insight into his thoughts than his more comprehensive publications. There, in a long essay on “Considerations governing the disposition of fleets” contributed by him in 1902 to the *National Review* and remarkable as his only attempt at a coherent interpretation of naval warfare as a whole, we come across, amongst many other highly interesting and important observations, the startling allusion to “the fundamental principle of all naval war, that defence is insured only by offence.”

This statement is so remarkable that we must examine its form a little more closely before we turn to analyse its content. It is one of the fundamental characteristics—and weaknesses—of Mahan’s theory that he is inclined to accept the “principles of war” evolved in land warfare unquestioningly for war at sea as well. If on this occasion, and on this occasion only in the whole of his works, we find him referring to a fact as “the fundamental principle of all naval war” we are forced to infer that this fact in his eyes constituted, not only the keystone of naval strategy, but the point as well in which war at sea differed fundamentally from war on land and from which therefore its peculiar characteristics were to be explained.

What then is the meaning of this sentence?

THE PROBLEM OF NAVAL DEFENCE.

From the time when ships for the first time were gathered into fleets and the primitive “cross-raiding” of the Middle Ages gave

way to ordered strategy, naval commanders have been beset by one overwhelming perplexity—how to intercept their opponents before these could have wrought irreparable damage to the interests entrusted to their protection. How easy, in comparison, is the task of a commander on land. There a general, if he does not feel strong enough to seek out and overthrow his opponent in his own territory, can interpose his army between the enemy and his country like a shield by taking up a favourable position near the frontier, in the secure knowledge that his opponent must either come to meet him there with all the advantages of defence in his favour, or else, if he tried to slip around him, would expose himself to all the dangers of a counterstroke in flank and rear.

How different and how infinitely more difficult is the lot of the naval commander! Between him and his opponent there stretches not the almost imperceptible frontier line, permitting the establishment of direct contact from the first moment of the war, but the broad common of the sea; immense compared with the narrow circle of observation and reach of fleets; unobstructed by accidents of the ground capable of canalizing an attacker's advance into certain narrow channels; devoid of occupation and consequently of the timely information available from that source; thus offering the infinitely more mobile attacker almost unlimited opportunities for evading the defender's vigilance and striking directly at his interests before he can interfere, the more so as these interests are themselves incomparably more widespread and difficult to guard. The interposition of a broad neutral ground between the two belligerent countries, instead of the direct contact of the common frontier, extends the area threatened by enemy attack from the strip adjoining this frontier to the whole coastline of the defender—in the case of island powers like Great Britain and Japan almost to the whole country. In these circumstances even the task of defending merely the coasts of the home territory may prove exceedingly difficult; it becomes absolutely harassing when colonial and other overseas interests multiply the number of vital objectives at which an attacker might be able to strike. The whole of Napoleon's Trafalgar campaign was based upon this distracting effect of an unlocated force at sea; and when Villeneuve's squadron got to sea at last, the objectives believed to be threatened by it were as far apart as Alexandria, Ireland and the West Indies.

Yet the defence of territorial possessions against attacks from the sea is not the most difficult task confronting a naval commander. After all, the local superiority gained by the attacker through evasion—unless subsequently confirmed by a victory over the defender's fleet hurrying to the rescue, as in the case of the French before Minorca in 1756 or before Yorktown in the Chesapeake Bay in 1781—can necessarily be only temporary. Most territorial objectives, however, will be capable of offering some resistance; vital points will be protected by fortifications, local forces able to maintain themselves until relieved. Thus the danger from such surprise attacks over sea lies mainly in the chance that the attacker may be able to achieve a decisive advantage before the defender's fleet can close

with him and bring him to battle ; as in the classical case of Napoleon's Egyptian expedition of 1798.

Infinitely more difficult to safeguard against the attacks even of a greatly inferior opponent is that other national interest represented by the maintenance of trade and shipping. Moving beyond the confines of the national territory over the great open common of the sea, it cannot seek protection behind the stationary defence of fortresses ; it lies open to every attack launched against it. Again, the extreme vulnerability of merchantmen and their incapacity to hold out until relieved makes their loss almost certain as soon as they fall in with an enemy raider, while their dispersal in a continuous stream of isolated units all over the seven seas on the other hand immensely complicates the task of their defence.

Thus in naval warfare a commander cannot be satisfied merely with " establishing the line of defence close before the region to be defended " *, as his military colleague on land can take up a position near his frontier. Nor would he be able to improve his chances of intercepting his opponent to any considerable degree by taking up some position midway between his own and his opponent's shores. In the case of very wide areas such as the Pacific in a war between the United States and Japan, in which the sheer distances involved and the dangers of an eccentric move would act as a restraint at least upon the main forces of the two belligerents, an intermediate position would probably be able to afford a reasonable degree of security to shipping in their respective spheres. That, however, is obviously an exceptional case demanding a special investigation.

In all narrow seas, however, such as the Baltic, the North Sea, the Mediterranean or the West Indies, wherever fleets face each other at easy striking distance, there is and has been one and one way only for a naval commander to ensure the safety of his charges, and that is by sweeping his opponent from the board altogether ; in other words by obtaining against him undivided " command of the sea." Nothing short of that will suffice.

That is the meaning of Mahan's words. Because " the sea is all one " ; because no part of it can be fenced off, fortified and defended by itself, therefore effective protection of our own interests on or by the sea can only be assured by driving our opponent from the whole of it. Thus, whereas on land we need not necessarily overthrow our opponent to hold our own, at sea we are forced to overthrow and drive him from it altogether merely for the sake of assuring our own safety. That is the fundamental difference between war at sea and war on land.

THE NATURE OF "COMMAND."

This fundamental fact unfortunately is not as clearly brought out as it should be in the terms commonly applied to it. What we wish to command or to control is not " the sea," but our opponent, or the neutrals ; it is precisely because we cannot " reduce " the sea

* Mahan: *Influence of Sea Power on the French Revolution and Empire*, I, p. 340.

"into possession" that there is the delicate and difficult problem of the neutral and his rights to be faced in naval warfare. Nor in "gaining command" do we acquire as is so often erroneously asserted, for ourselves what we had been enjoying all the time, use of the sea; we acquire the power to exclude our opponent from that use and thereby to prevent him from attacking us or from interfering with our own actions. The word "command" does not preclude the idea that the object to be commanded might not be divided; "exclusion" shows beyond any possibility of a misunderstanding that only one side can obtain "command" by excluding the other, and that, although "command" may be local and temporary only, simultaneous "divided command" of the same stretch of water is impossible and no "command" at all. It is this one-sided character of the "command" which gives to war at sea such an infinitely more dramatic aspect than on land. At sea there is no halfway house between victory and defeat, because there is no difference between what is needed for defence and what for attack. One side only can gain security at the cost of the other—or neither.

Nor does the matter rest there. Beyond the economic distress imposed upon the weaker party in naval warfare by the interception of his sea communications "command of the sea" confers upon the victor a one-sided advantage to which neither war on land nor war in the air has any parallel to offer. For the belligerent who has obtained for himself "command" not only enjoys practically complete immunity from invasion over sea, but in addition is capable himself of threatening with perfect impunity his opponent with all conceivable forms of attack against his territories, from diversionary landings to real invasions. Whereas on land the weaker belligerent, as long as his forces are not completely destroyed or dispersed, can not only carry on the struggle, but still hope to turn the tables upon his opponent, in maritime warfare the side which loses the power to dispute the "command" is practically helpless against the attacks of its enemy and without any hope of changing that situation.

COMMAND OF THE SEA AND BLOCKADE.

The obvious, the best and the shortest way to obtain such command has always been to seek out the enemy's main forces and destroy them in battle. Unfortunately, in naval warfare we are not always at liberty to do so. On land, once the issue has been joined, there is no possibility for either side to evade its opponent's impact, and an attack can, therefore, be pressed home, if need be, until it has completely broken down the weaker side's power of resistance. At sea, on the other hand, the weaker side not only enjoys almost unlimited possibilities of evasion, but, if an attack should be pressed home to its shores, is always able to remove its forces out of the enemy's grasp altogether, by the simple expedient of withdrawing them into its fortified ports, where he is unable to follow them. Thereby it does indeed relinquish the command to its opponent, but, by precluding him from completing his success and

preserving its powers of resistance and counter-attack, prevents him from definitely establishing and consolidating his superiority.

In such a situation, therefore, there is nothing left to the stronger side but to attempt to secure the precarious temporary command gained by it, by posting superior forces before the ports into which the enemy has withdrawn and thus establishing a hold upon him where there is a reasonable chance of intercepting him—that is his point or points of departure.

“Command of the sea” thus in the last resort rests upon the power to blockade. Not in the sense in which some of Mahan’s critics have misunderstood his teachings, as if by blockade a superior fleet could enjoy all the privileges of command of the sea without running the risks inseparable from battle. Nobody has been more emphatic than Mahan himself upon the grave defects and limitations of the control established by even the closest of blockades, the tremendous strain imposed by them upon the blockaders, and the immense feeling of relief brought about by every decisive engagement. But decisive battles such as Quiberon Bay and Tsushima, relieving the victorious side of all and every apprehension on the part of the vanquished, are rare in naval history. Even Trafalgar did not relieve the British Fleet from another ten years of dreary watch over the military ports of the Continent, from Antwerp to Venice; and in the vast majority of cases the stronger side has to be satisfied with the precarious hold upon its opponent provided by blockade.* Without that possibility to fall back upon, the mere determination to seek out the enemy and bring about a decision would be of no avail to secure “command.” Nor is blockade merely a *way* to acquire “command”—by forcing the enemy to come out eventually and offer himself to battle—but must be considered itself a *form* of command, because—although with many imperfections—it fulfils its function of excluding our opponent from the use of the sea. Thus it is blockade which really constitutes the corner-stone of naval warfare, while the fuller measure of command achieved by the complete destruction of the enemy’s main forces forms merely its superstructure.

This defensive function of blockade, so often unduly disregarded compared with its offensive function as an instrument to bring economic pressure to bear upon our opponent, is stressed by Mahan throughout his writings, and never more clearly and convincingly than in the concluding section of the special essay on “Blockade in relation to Naval Strategy,” contributed by him in 1895 to the Journal of the Royal United Service Institution.

“Using the term blockade loosely, as the nearest single word to comprise any close watch over the entrance of an enemy’s port with a view to impede egress or ingress, such blockades are of a twofold character—offensive and defensive. The first is directed against both egress and ingress, but more especially ingress, being meant to prevent the entrance of needed supplies, and being, therefore, essentially a blow at his communications. The second also has a twofold aim, but its chief

* Moreover, once such complete command has been established naval strategy proper, as Corbett remarked, is at an end. It is only as long as command rests merely upon blockade that such problems as defence of trade and its interconnection with the control of the enemy’s main forces retain any real significance.

object is to prevent egress unmolested, because such freedom of issue to an enemy means danger, more or less great to certain national interests; which because they be outside the national boundaries cannot be protected by ordinary defence measures, by fortifications and organized land forces. Such a blockade is, therefore, essentially defensive. Resort to it implies the existence of great national external interests, which are open to injury and can in no other way be so cheaply, sufficiently and certainly be defended. If the external exposed interests are many, it is impossible to imagine any means of guarding them equal in efficiency to that of heading off the danger at its sources. This is the strategic necessity—the decisive strategic consideration, which dictates the method essential to be adopted.” *

THE THREEFOLD FUNCTION OF BLOCKADE IN NAVAL DEFENCE.

This remarkable passage is of quite exceptional interest. In it we find, together with the express recognition of the “external” (and scattered) nature of the interests involved as the fact which makes their defence by blockade imperative, the first attempt to explain, although imperfectly, the different functions blockade fulfils in such defence. For the protection of these external interests against attack is the fundamental task of the blockade, but not the only one. In addition to it blockade serves to fulfil two other functions, intimately linked up with it and hardly less important, yet almost completely ignored—to ensure our force against being cut up in detail and to make defence, and in particular defence of trade, economically possible at all.

For—a point which unhappily has not always been clearly enough realized in recent naval discussions—defence of our interests, in particular our trade, through direct protection alone is not merely, as we have tried to explain above, inadequate; it is, above all, a fundamentally vicious strategy, in so far as it leaves the enemy the full initiative in attack, at the same time that it forces us to a fatal dispersal of our own forces. Hence our cruising squadrons and convoys would constantly be facing the danger of running into a superior enemy and being overwhelmed by him; a danger which is the greater in view of the total lack at sea of accidents of the ground, which might enable an isolated force to maintain itself until relieved.

Even in the highly improbable case, therefore, of neither side trying to exploit this state of things and both belligerents confining their activities to the direct protection of their own trade and sporadic attack by cruiser warfare upon its opponents—as some are inclined to prophesy—such clashes between the individual fractions on both sides as would occur would obviously be determined by the laws of chance and not according to the total strength of each side—a state of things which clearly tends to favour the weaker. In fact such a course on the part of the stronger sea power would be nothing less than the voluntary and absolutely purposeless renunciation of all the possibilities, both of full defence and of effective attack, conferred upon it by its superiority.

Above all, however, there is no reason whatsoever why, in case the stronger side should really thus neglect to make use of its superiority, the weaker side in its turn should fail to be struck by the

* Journal of the Royal United Services Institution, Nov., 1895, pp. 1067–8.

obvious idea of temporarily leaving its convoys at home and concentrating all its forces upon a shattering surprise attack upon its opponents' scattered host. Thus even if the stronger sea power should for some inconceivable reason fail to use his opportunity on its own account, the mere necessity of protecting himself against the exploitation of that negligence by his opponent must force him by blockade at the same time to concentrate his own forces and to impose his control upon his opponents.* Blockade is thus not merely the means by which the stronger side in naval warfare assures the immunity of its territorial possessions and shipping. It is, above all, the method by which it is enabled to reduce the "natural anarchy" of naval warfare into the comparative order of a "planned strategy," which will not only secure it from being cut up in detail in chance encounters, but also alone will enable it to make its superiority felt.†

The functions blockade has to fulfil in the strategy of the stronger sea power do not, however, end there. Hardly less important is the economy of forces effected by it, which alone makes defence of trade on a large scale possible at all. As Mahan says in the same essay :

"Whatever the number of ships needed to watch those in an enemy's port they are fewer by far than those that will be required to protect the scattered interests imperilled by the enemy's escape. Whatever the difficulty of compelling the enemy to fight near the port, it is less than that of finding him and bringing him into action when he has got far away. Whatever the force within, it is less than it will be when joined to that, which may at or near the same time escape from another. Whatever the tactical difficulties involved, the strategic necessities compel a diligent study of how to meet them."‡

Here again we find the two aspects of blockade, concentration of our own and interception of the enemy's forces, co-operating, but this time not in coincidence, but as two distinct processes. On the one hand we have the economy in those forces directly opposed to the enemy's main force or forces, the "battlefleet," effected by its concentration from the watch over the whole area to that over the enemy's base or bases ; on the other there is the reduction in the strength of the forces entrusted with the direct protection of our shipping—the "control fleet"—behind the general cover provided by the battlefleet, made possible through the interception of the enemy's main forces.

For without blockade, escorts, as we have seen, if they are to

* The following consideration may perhaps help to make the coincidence of these two aspects of blockade clearer still. As long as both parties in naval warfare remain on their own sides, they can either try to protect all, and then are forced to disperse their forces, or else, concentrate their armed forces and lay their interests open to surprise attack. The only point in which the defence in naval warfare can both concentrate its forces and at the same time interpose between its opponent and the whole of its far-flung interests is before the enemy's port or ports.

† The difference between the two can well be gauged, if we compare, for instance, the quite unnecessary uncertainties, difficulties and checks, which British naval strategy incurred during the greater part of the War of 1739, both in the West Indies and in European waters, through neglecting to watch first the Spanish and later on the French forces in their home ports, with the firm grasp upon its opponent's movements maintained and continuously re-established by it throughout that masterpiece of "planned strategy," the campaign of Trafalgar.

‡ *Journal of the Royal United Services Institution*, 1895, p. 1061.

confer real security, would have to be made as strong as the strongest enemy force operating in the waters to be traversed by it. In the old days therefore, when it was impossible to keep a fleet permanently in watch over the enemy's fleet, shipping was concentrated into huge convoys and conducted by the whole battlefleet through the offing of the enemy's fleet base and then, the danger zone passed, sent on under a much smaller escort.

The dangers and difficulties of this primitive system of naval defence were, however, such as to make its replacement by a better method an urgent necessity. Through these convoy duties the battlefleet was apt to be so tied up that it had to neglect the enemy's forces and thus expose the home country itself to the imminent danger of a sudden attack—as was the case as late as in the War of 1739. The protection which it was meant to afford, on the other hand, depending upon the assumption that the enemy's fleet had not moved from its port, remained but precarious, as was demonstrated, when in King William's War the whole French fleet which had left Brest unknown for Cadiz there fell upon the Smyrna convoy, sent on under a weak escort, and captured it. Thus the system of a permanent watch over the chief enemy ports, which began to take shape with the establishment of the Western Squadron in the later part of the War of 1739 and found its perfection in the close Blockades of the Seven Years' War and of the struggle against the French Revolution and Napoleon, although primarily directed against the attempt of an armed invasion, at the same time served to protect British shipping against attacks by the main enemy forces.

This substitution of a general indirect protection through blockade for the direct escort formerly afforded to convoys by the whole battlefleet did not dispense with all direct protection of shipping altogether. The extreme vulnerability of merchantmen even to the weakest forms of sporadic attack, referred to above, made their concentration in convoys and protection through escorts and special cruising squadrons against such isolated raiders as would always be able to slip even through the closest watch, still necessary. The essential point was, however, that these escorts, forming no longer the first line of defence, could henceforth be so far reduced individually that their total number could be sufficiently expanded to keep pace—though not without a severe strain upon the country's naval resources—with the steady increase in the volume of trade and shipping that had to be afforded protection in the later eighteenth century and the beginning of the nineteenth, for which it would have been impossible to provide with under the old system.

Thus blockade reveals itself as the measure by which a superior sea power, by the concentration of its main forces before the enemy's ports and the consequent reduction in the strength of the subsidiary control forces entrusted behind that "front line" with the direct protection of its shipping, is capable of reducing the task of the defence of its trade—impossible to fulfil as long as every convoy is threatened with the full brunt of the enemy's attack—to economically manageable proportions. Against this the weaker side's policy—having nothing to lose and everything to gain—has always been to

counteract this concentration of the struggle by dispersing its sporadic attacks upon the stronger side's communications into as many points as possible, not only with a view towards increasing there by its chances of success, but, above all, of forcing upon the superior belligerent such an extension and strengthening of his escorts as to make the strain upon his resources unbearable.

COMMAND OF THE SEA IN THE WORLD WAR.

The system of naval defence by close blockade and direct trade protection through convoys had reached perfection in the wars against the French Revolution and Empire. For nearly a hundred years after that gigantic struggle up to the Russo-Japanese conflict, no major naval war occurred. In the mean time the technical fundamentals of naval warfare had undergone a change greater than any which it had experienced since the sailing ship replaced the galley. On the whole, the changes introduced in naval strategy by the substitution of the steam-driven ironclad for the three-decker tended to favour the weaker rather than the stronger belligerent.

The incomparably greater precision thereby introduced into the movements of fleets and individual vessels certainly was apt to strengthen the superior sea power's grip upon its opponent—though not perhaps as much as might appear at first sight, in view of the advantages which the blockading force used to derive from the restrictions imposed upon its opponents' chances of escape by adverse winds. But against this the steamship's dependence upon fuel supplies, greatly reduced cruising radius, and infinitely smaller capacity to keep the sea, tended to make extended operations or prolonged watches more and more difficult; while the new weapons developed since the American Civil War—the mine, the submarine, and the torpedo—threatened to make the close blockade impossible altogether. Sampson before Santiago de Cuba in the Spanish-American War of 1898 could still watch the narrow entrance just out of gun-range of the defender; Togo before Port Arthur, barely six years later, not only lost two battleships, one third of his main forces, on mines, but had to loosen his grip upon the port and its squadron to a dangerous degree. The question arose—would a fleet, with the further perfection of these weapons, be any longer able to maintain even such a loose form of tactical blockade as Togo had employed; and what would become of naval strategy, if with that cornerstone the whole system of naval defence through command of the sea broke down?

The vital significance of that question was not realized at that time, either in Great Britain* or in Germany, despite the peculiar bearing which it had upon the strategic position of their navies. The German Navy in the years before the World War continued to base its whole strategy upon the assumption that the British Fleet in case of a conflict would once more sally forth to blockade the

* Sir Julian Corbett in his "Principles of Maritime Strategy" is far less clear on this point than had been Mahan.

Heligoland Bight at close range and thus offer it with the opportunity for counter-attacks—in particular by her highly trained torpedo-craft, which, it was hoped, might reduce the Grand Fleet's superiority to such an extent as to give the German High Sea Fleet the chance of defying it in battle. This calculation contained one fundamental error. It completely ignored the fact that the unusually favourable strategic position of the British Isles with respect to the lines of communication of all powers bordering upon the North Sea and Baltic gave the Grand Fleet practically all the advantages of "Command of the sea" which can normally only be acquired through battle or close blockade, without having to run the risk inseparable from these. Offensively, the control of German (and neutral) shipping, which the Grand Fleet exercised from Scapa Flow and the Channel ports was no whit less complete than if the German North Sea ports had been blockaded at close range, and probably even more effective in the final result, because it automatically included the neutral countries adjoining Germany as well. Defensively, the long range strategic blockade imposed upon the German High Sea Fleet could naturally not be in any way as close as would have been a tactical blockade of the Heligoland Bight, but it sufficed to fulfil its purpose. It was not able to protect all territories; leaving the German Fleet free to roam the North Sea it could not prevent it from bombarding the British East Coast; but it was capable of maintaining such a hold over the German Fleet as to ensure the other allied territorial possessions and practically all their communications against attacks by German surface forces. On the other hand the absence, with one notable exception of which more below, of any vital British lines of communication in the North Sea—which alone made it possible for the Grand Fleet to concede such a measure of freedom in that area to the High Sea Fleet—deprived the latter of the only effective means of bringing its opponent to battle or cutting him up in detail and thus threw the German High Command back upon the strategical makeshift of bombarding the British East Coast; not for the sake of the damage inflicted thereby, which was strategically irrelevant, but as psychological pressure upon the British Command to induce it to a rash exposure of part of its forces—a plan which very nearly succeeded in the first great German raid upon that coast on December, 16, 1914.

The full significance of that achievement was not revealed until the submarine campaign threatened the Allies with a new menace which they would have been incapable of dealing with effectively without this control exercised by the Grand Fleet over the German surface forces. Strategically the submarine campaign constituted nothing new, however novel the technical instrument with which it was waged. What was new was that the direct protection of shipping through convoy and escort, which in the old wars, as we have seen, protected it behind the shield formed by the battlefleet control of its opponent against the attacks of sporadic raiders, had not been instituted again at the beginning of the World War. The reason for this departure from the traditional form of commerce protection was the fact that the immense increase in the volume of shipping since



H.M. ESCORT VESSEL EGRET.
Commissioned for service November 11, 1938.
(By courtesy of the builders, Messrs. J. Samuel White & Co.)

the Napoleonic age was believed to have made such a proceeding out of question any longer. In the old days, when trade still consisted mainly of luxury goods which did not vitally affect the economic life of the country, it could be carried on in a few large convoys sent out two, three, or four times a year to the principal markets and often enough held up for many months at a time. In our days, however, the dependence both of the industry and the food supply of Great Britain upon a constant stream of overseas supplies was deemed too intimate to allow any longer for the interruption and loss of time inseparable from the organisation of that steady flow into convoys, while the number of escorts needed was believed to be far in excess of the limited forces available for that purpose. It was upon this lack of anything like the number of escort vessels needed, rather than upon the technical and navigational difficulties and drawbacks of the convoy system, that the Admiralty based its original refusal to reintroduce it; and it was only when it was realized that the estimated escort requirements were based upon an exaggerated assessment of the number of vessels entering the ports of the United Kingdom, and when American reinforcements became available, that the convoy system was at last brought into being in April, 1917 and within a few months succeeded in dispelling any danger that Great Britain might succumb to the U-boat menace.

Without, however, the indirect protection against the interference of German surface craft afforded to the whole convoy system through the command exercised by the Grand Fleet from Scapa Flow, the task of finding the escorts would have been insoluble. It was only because they were not expected to deal with anything more formidable than submarines that the escorts could be composed of vessels (destroyers and small craft) so weak that they were available in the numbers needed, if barely so. If convoys had needed protection against cruiser attack as well it is difficult to see how that demand could possibly have been met.

The vital importance of this cover provided for the system of trade defence by the Grand Fleet is most strikingly exemplified by the repeated misfortunes which befell the one convoy, which owing to its course was but imperfectly protected by it: the Scandinavian convoy from Lerwick to Bergen running for the whole of its course not behind, but in advance of the Grand Fleet's position at Scapa Flow. It did indeed enjoy a considerable degree of protection from the various patrols scouring the northern half of the North Sea between its course and the bases of the German Fleet, but as events were to show this indirect protection was not sufficient to prevent German tip and run raids against it from succeeding. On October 16, 1917, two German mine cruisers Brummer and Bremse fell on the convoy and sank it to the last ship, including the two destroyers of the escort. The fact that after having raised the alarm they were able to make their way back unharmed from the latitude of Bergen to their bases over a course of some 500 miles through 80 British men-of-war hunting for them is a most striking testimony to the possibilities for evasion even in relatively so restricted waters as those of the North Sea. On December 12 of that year this exploit was

repeated by the second torpedo subflotilla again sinking most of the steamers together with one destroyer and all the trawlers of the escort. After this second disaster the convoy, the point of departure of which was transferred from Lerwick to Methill in the Firth of Forth was greatly strengthened by the addition of a whole battle squadron to the escort, thus offering to Admiral Scheer an opportunity to cut it off with the High Sea Fleet, which he would have seized if the planned raid had not had to be postponed indefinitely at the last moment for other reasons.

The case of the Bergen convoy is frequently quoted as an example of the fact that fighting between commerce raiders and convoy escorts tends, by the gradual strengthening of forces on both sides, to bring about in the end decisive battles. Another and more impressive argument seems to the writer to emerge from it. It is, the utter viciousness of any system of commerce protection based not primarily upon the "command of the sea" but upon direct protection by escorts only; and the danger to which, in the absence of such fundamental cover, that system exposes every individual convoy of being overwhelmed by superior forces, a danger which the mere strengthening of escorts, far from removing, merely tends to increase by offering an opponent in addition a chance of cutting up the main forces in detail as well.

In this sense the incident of the Bergen convoy—and the whole story of the World War—is an eloquent testimony to the fact that, despite all changes in their outer appearance, the fundamentals of naval strategy, as gradually disclosed by the accumulated experience of centuries, have in no way been affected.

THE CHALLENGE TO THE IDEA OF "COMMAND" IN THE POST WAR ERA.

Not all those, however, who in the years since the war have tried to elicit its lessons, have come to this conclusion. The peculiar geographical conditions under which the struggle between the British and the German navies was waged—endowing the former with the full benefits of command of the sea without the need to acquire it by battle or close blockade—have tended to obscure and confuse the real issues to such an extent as to throw naval discussion into the most profound and far-reaching misunderstandings. Thus, the almost complete absence of great pitched battles in this particular case, and the insufficiency of the only one that did take place to affect the vital issue of the British control over the German Fleet and the Atlantic communications, has tended to mislead naval theorists into the utterly unjustified assumption that the role of battles and of all actions directed upon purely "military objectives" was played out in naval warfare, which would in future restrict itself exclusively to the economic issue of the "control of the vital communications."

The real misunderstanding arose, however, when the fundamental role which the "command" had played in naval defence throughout history and again in the World War was so completely overlooked

that this "control of the vital communications" could be erroneously identified with their direct protection by escorts and cruising squadrons pure and simple, and the struggle for exclusive command could be considered as a purely military action diverting strategy from its "true purpose" of trade warfare.

Thus there arose the truly paradoxical situation that this new movement, setting out to restore the true "maritime" character of naval warfare against its military misdirection by Mahan and his followers, in reality rejected the "fundamental principle of all naval warfare" in favour of a conception of naval strategy which ignored not only the whole experience of nearly five centuries of naval warfare, but the fundamental difference distinguishing naval from land strategy, revealed by that experience. Nevertheless this new and revolutionary interpretation of naval strategy found its adherents in all navies and in particular in those of the lesser sea powers, France, Italy, Russia and Germany. For here another motive intervened which greatly helped to promote the spread of this new doctrine.

Whatever the merits of the "command of the sea" it was specifically a strategy in favour of the stronger belligerent, but left no hope to the weaker side. What, however, were those continental navies to do, which had little if any hope of ever finding themselves the stronger side in a naval conflict? Were they perpetually condemned in advance to a hopeless struggle? Or did not this new doctrine hold out to them the hope that it might be possible to achieve at least the fundamental task of securing their own communications even though incapable of attempting to secure "command"?

These ideas have found their clearest and most extreme expression during the last few years in Germany—where the violent reaction brought about by the breakdown of the purely "continental" conception of naval warfare as a struggle for military supremacy between the two opposing fleets, with which the German Navy had gone into the World War, had paved the way for a doctrine which on the one hand presented itself as a return to the true "maritime" conception of naval warfare while on the other holding the prospect of achieving the maintenance of the vital Atlantic communications without the necessity for acquiring "command"—in two small publications, the article on "Naval Warfare of Tomorrow" by Captain von Waldeyer-Hartz* and a small booklet on "Modern Naval Strategy" by Ernst Wilhelm Kruse, a young civilian student of naval matters published in 1938.†

While Captain von Waldeyer-Hartz confines himself to a gratifyingly clear exposition of the main tenets of this new doctrine on general lines without reference to the particular case of Germany, maintaining:

that naval warfare in future was going to be directed primarily upon the economic breakdown of the enemy and not upon his military defeat;

* "Wissen und Wehr," 1936, p. 183 ff.

† "Neuzeitliche Seekriegsführung," Berlin, 1938.

that operations in consequence would be directed to the attack on the enemy's communications and the defence of one's own ; that great battles would no longer take place and that such smaller or greater clashes as might occur would arise out of the accidents of cruiser warfare, not, however, be sought on purpose for the acquisition of a general "command" ; that naval forces would, therefore, be widely dispersed and the struggle for communications be waged simultaneously all over the Seven Seas.

Dr. Kruse, rushing in where angels fear to tread, pursues the new doctrine to its utmost conclusions beneath a jumble of glaring contradictions and misstatements. Yet he is particularly interesting, for in so doing he provides a remarkable insight into the real problems—and very concrete issues—hidden beneath his apparent absurdities. Above all, he proclaims the revolutionary character of this new conception of naval strategy as the doctrine of the "semi-oceanic" Powers—liberating them from the domination of the classical theory representing the interests of the oceanic Powers (Great Britain, the United States and Japan) and for that reason inclined to stress the military side of sea power rather than its economic aspect, which these powers were glad to make use of but did not care to see turned against themselves. His vehement emphasis in so doing brings out very clearly what von Waldeyer-Hartz fails to express, that this new doctrine in reality covers not one but two fundamentally different cases, corresponding roughly to the offensive and defensive aspect.

There is first the case of a struggle between two such semi-oceanic powers, in which, in the absence of a sufficient superiority on either side to enable it to acquire total command, each belligerent would concentrate his efforts upon the maintenance of his own communications by direct protection, and confine his attacks to cruiser raids against his opponent.

Now the obvious conflict of that kind in the case of Germany, and the one which Kruse in addition makes perfectly clear he had in mind in this connection, would be a struggle between her and France, or France and Soviet Russia combined. Such a conflict between the French and German navies, however, would be fought out under conditions hardly less peculiar than those that determined the Anglo-German struggle during the World War. For, owing to the interposition of the British Isles (supposedly neutral) neither side could hope to undertake a decisive attack upon the other. German convoys could cross the North Sea at night and either reach British territorial waters or else the line Scotland-Bergen, and thence be conducted into the open Atlantic with its almost unlimited possibilities of evasion, with the result as Kruse puts it, "as if the mouths of Elbe and Weser were strategically projected upon the line Scotland-Bergen" ; while the French Navy on the other hand would be able to hold her own against German commerce raiders in the Bay of Biscay. The remarkable manner in which, in this peculiar case, the form of naval strategy envisaged by von Waldeyer Hartz and Kruse would indeed agree with the facts goes a long way towards explaining its reception in the German Navy ; though it fails to justify its erection into a general rule—even for the "semi-oceanic" powers alone. The case of an Italo-French conflict would obviously be governed by widely different considerations.

Infinitely more interesting, however, is the other case of a conflict between a "semi-oceanic" and a superior sea power. For here Kruse—while discreetly dropping the question whether in these circumstances the weaker power could still hope to fulfil the defensive side of its task—suddenly comes forward with nothing more or less than the startling suggestion not only that the weaker belligerent should concentrate upon the attack, but that doing so, he would actually enjoy a definite superiority over the stronger :

"In contrast to the conditions obtaining in land warfare," he says, "at sea the stronger side, because it is also normally in possession of more extensive communications, sees itself induced to remain strategically on the defensive, while the weaker party tends to favour an offensive strategy. In this relationship there is a change only if the stronger side should have no great and important communications to protect, while the converse would be true of the weaker side. The naval warfare of the weaker side—and herein is again found a peculiarity of naval warfare as compared with conditions on land—favours offensive operations against a defensive strategy to a remarkable degree, so that the weaker belligerent finds himself positively urged by it to take the offensive. The fundamental strength of the offensive in naval warfare lies in the fact that the attacker is able to concentrate his own forces for a blow against fractions of his opponents, without the attacked being able to ascertain betimes the direction of such a blow and to find the time needed to concentrate his forces in turn to parry it. Under the presupposition it is true, and this is the normal case, that the attacked party, the one which remains strategically on the defensive, is not capable of concentrating his main forces in protection of his vital communications to the same degree as was the case during the World War both with the British and the German navies."

This startling challenge to all the sacred doctrines of Sea Power cannot simply be dismissed offhand, however mad it may sound ; for there is method in this madness. The picture of the uncertainties and dangers besetting the stronger sea power's defence which he draws here is a true picture of what defence of trade would be like, if no "command of the sea" existed ; the error begins only in the assumption that such "anarchy" is inevitable in naval warfare, and in the utter failure to perceive that it is precisely to meet such a situation as here depicted that Sea Power in the course of centuries has evolved the system of naval defence through "command" ; a failure, which goes back in the last resort to his association of "command" with the destruction of the enemy's forces in battle and the complete ignoring of the vital role played in it by blockade, which characteristically receives hardly any mention at all.

Yet the fundamental problem raised by him, although grievously mishandled, remains. If we are once more brought back to the fact that naval defence depends in the last resort on blockade, can blockade still be counted upon under present-day conditions ?

We have seen that the problem of close blockade has found no clear solution during the World War, because the Grand Fleet, being able to exercise "command" without having to resort to it,

preferred not to do so. Hence, although the general assumption to-day is that close blockade is not longer practicable, definite proof has not yet been adduced ; while weighty voices have, on the other hand, been raised in warning against an over-hasty renunciation in this respect.

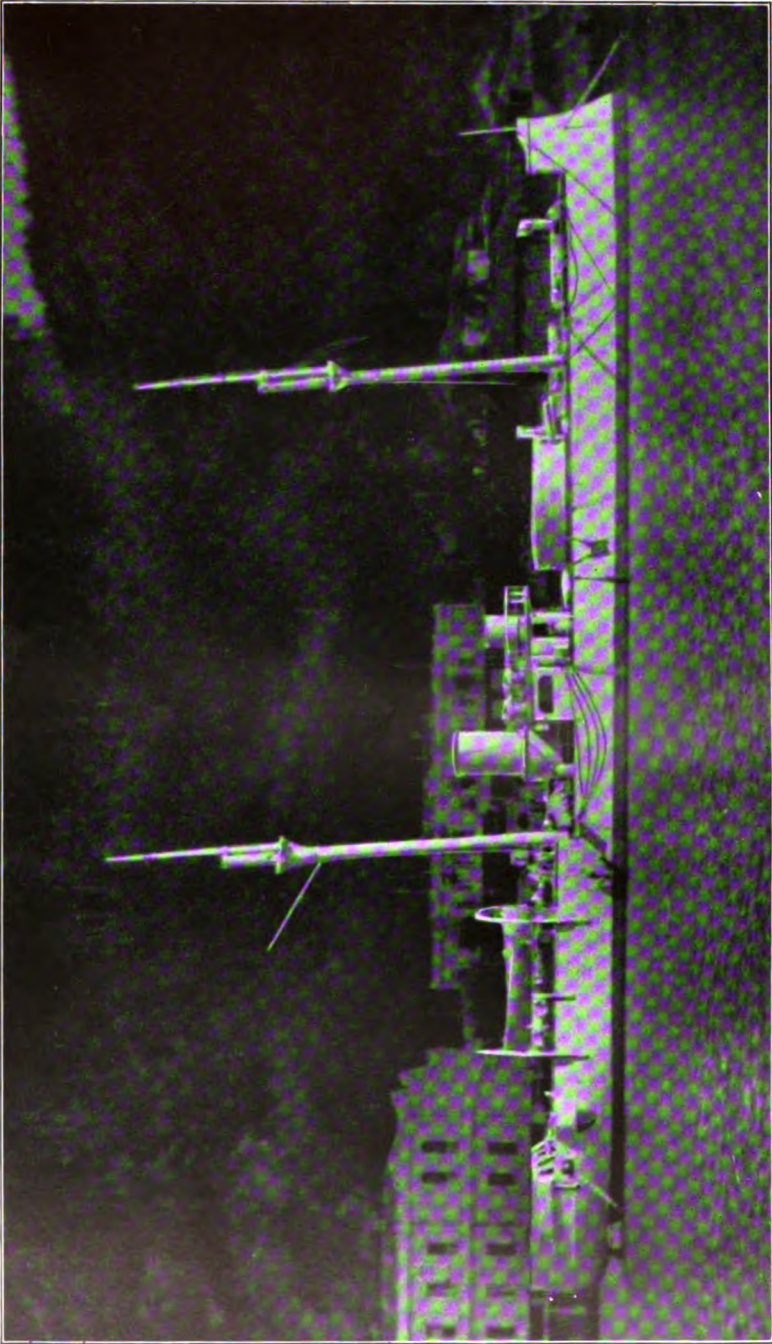
Undoubtedly the new factor introduced since the World War by the immense development of air power, has served to make the position of the blockader infinitely more difficult even than it had already become by the various submarine weapons. Yet here again the last word has not yet been spoken. It is quite possible that the strategic necessity of the blockade may bring forth such adaptations to the new conditions, as Admiral Castex's turtleback battleship which will enable the fleets of the future to come back again even to the close form of blockade.

Failing that, there still remains the looser form of strategic long range blockade to fall back upon such as it had been evolved during the World War both in the North Sea and the Adriatic. Yet, quite apart from its limited applicability, even the survival of this form, representing the minimum of hold upon an opponent sufficient to maintain "command," can by no means be considered as assured.

With the present development of aircraft even the farthest bases from which such a long-range blockade could be conducted lie well within the reach of enemy bombers. Thus the question, whether the bomber by making them untenable may indirectly bring down the whole system of naval defence through the impossibility of maintaining blockade, is likely to prove infinitely more important for the future development of Sea Power than the question of its capabilities for direct attack either upon the battleship or trade, which hitherto have almost exclusively received attention.

For the importance of the issues involved, as we have seen, cannot possibly be overestimated. If "command of the sea" has been the means by which sea power has hitherto been able to solve the problem of naval defence, it can to-day dispense with it less than ever before. For the almost incredible frictions, delays, and negligence of the enemy to use his opportunities during the old wars, before this system of trade defence was brought into being, is something upon which it is no longer possible to reckon to-day ; while the vital importance and the vulnerability of the overseas communications has increased a hundredfold. Therefore the suggestion seriously envisaged by some of the leading naval authorities of to-day of a return to the old primitive system of huge convoys protected by the whole battlefleet, in case the system of defence through command should definitely break down, although strategically sound, is economically hardly practicable. But it illustrates the vital importance of the "command of the sea" that it should have been raised again at all.

H. ROSINSKI.



THE HUASCAR.

Moored off the Naval School, Talcahuano, Chile.

CHAPTER VII.

VISITS TO THE NAVIES OF SOUTH AMERICA.

CHILE.

CHILE, which is slowly but surely recovering from the financial depression of a few years ago, is rich in naval traditions. The victories of past heroes, many of them bearing British names, are perpetuated in her Navy to-day. The armoured cruiser O'Higgins is called after the great General Bernardo O'Higgins. He was a Chilean son of Don Ambrosio O'Higgins, Viceroy of Peru, an Irishman in the service of the King of Spain, and he led Chile in her fight for independence against the Spaniards in 1810. He became her first President in 1819.

Captain Arturo Pratt was in command of the *Esmeralda*, a wooden sailing ship, when she fought and gallantly tried to ram the Peruvian Monitor *Huascar* at Iquique in the war of 1879. Captain Latorre of the *Blanco* (later promoted to admiral) avenged the loss of the *Esmeralda* when he defeated and captured the *Huascar* on October 8, 1879. The *Huascar* is still anchored in front of the Naval School at Talcahuano.

There is also a close association of long standing between the Chilean and British Navies. From 1810 to 1818 that great champion of South American independence, Admiral Lord Cochrane, commanded the Chilean Navy when it triumphed over the Spanish fleets and enabled Chile to take undisputed command of the sea. The ship that was being built for Chile in England during the great war to take his name is now the aircraft carrier *Eagle* in the British Navy. The majority of the ships of the Chilean Navy were built in British yards; the *Almirante Latorre*, flagship of the present Commander-in-Chief, Rear-Admiral Vicente Merino (Chief of Staff to Vice-Admiral Reyes del Rio, Director General of the Navy), is a battleship of 28,950 tons, and was the former H.M.S. *Canada*. The destroyers *Riveros*, *Uribe*, and *Williams* that have just been scrapped were the former ships *Faulkner*, *Broke*, and *Botha* of the Royal Navy.

Many Chilean naval officers have served in the British Navy for periods of training. Admiral Merino himself, as a lieutenant, served in H.M.S. *Invincible*, battle cruiser, in the Home Fleet in 1909. In pre-depression days (up to 1932) a British Naval Mission comprising specialists in gunnery, torpedo, submarines, and engineering, was attached for some years to the Chilean Navy, to which it imparted the teachings of Whale Island, Vernon, Fort Blockhouse, and Keyham College.

To illustrate further the close similarity between the British and Chilean Navies, mention must be made of the Retired Chilean Naval Officers' Association—*Centro de ex Cadetes y Oficiales de Marino*—with head offices in Santiago, and various branches all over the world called *Apostaderos* or Naval Stations. In this association before entering the *Apostadero*, the senior officer and junior lieutenant “leave their ranks in the cloakroom” and are known to one another as Cadets.

A VISIT TO VALPARAISO.

Besides the Almirante Latorre, ships anchored in Valparaiso Bay during October, 1937, included the cruiser Blanco Encalada, the submarine depot-ship Araucano, the submarines O'Brien and Simpson, and the destroyers Serrano, Requielme, Aldea, and Videla, four of the destroyers bought from England in 1928. The other two destroyers, Orella and Hyatt, the submarine Thompson, the armoured cruiser O'Higgins, the training ship General Baquedano, the Capitan Prat, five Holland type submarines, two old leaders Lynch and Condell, as well as six old destroyers, two old depot ships, and the Government vessel Condor were at the naval Base at Talcahuano. The depot-ship Araucano is the latest ship and the only addition to the Chilean Navy since 1929.

That year, 1937, the squadron had more practice than former years, and days at sea averaged about three a week. The squadron is constantly active from January 5 to February 15; April 1 to September 5; October 20 to December 20. The rest of the time is taken up with refitting, repairs, and leave periods.

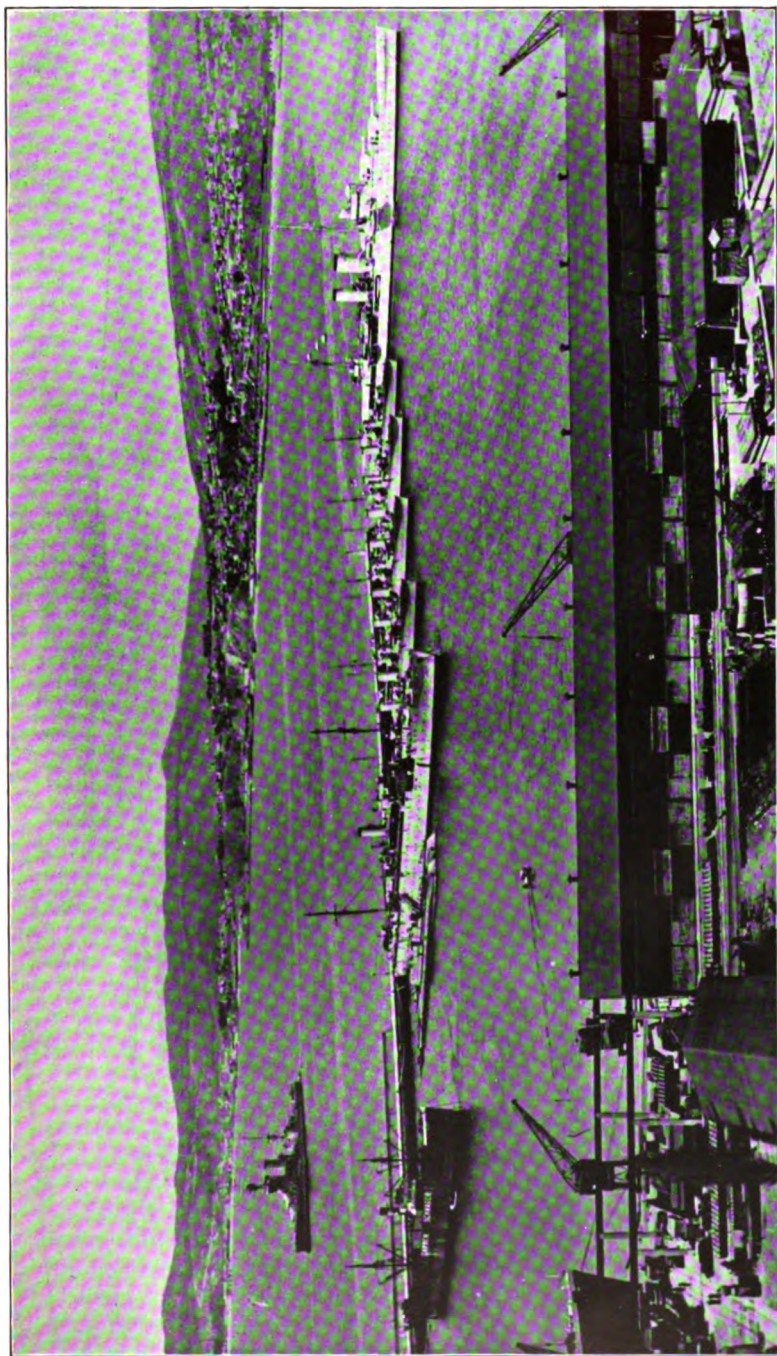
All the ships looked smart, and their ships' companies healthy and efficient at their drills. Perhaps next year the Government may order those two new cruisers from England. Maybe the British Naval Mission will come again to Chile. If they do they will find the young Chilean naval officer and seaman worthy upholders of the great traditions of Chile's naval history.

OFFICERS.

In the Chilean Navy to-day there are 800 officers on the active list; of these 330 belong to the Executive branch, and the remainder compose the engineers, doctors, and paymasters. There are 26 doctors on the active list.

A naval aspirant goes to sea at the age of 19. He receives 500 pesos a month (an English £1 is worth 123 pesos in Chilean currency to-day). At the end of two years he is promoted to midshipman with a salary of 800 pesos a month. In four years he becomes a second lieutenant with 1,000 pesos a month, and after a further five years he becomes a first lieutenant with a pay roll of 1,500 pesos a month.

His further promotion depends on vacancies and age. He is retired compulsorily at 60 with a pension of 100 per cent. of his salary. Presuming that he becomes a second lieutenant at the age



SHIPS OF THE CHILEAN NAVY AT VALPARAISO.

In the Bay, Almirante Latorre.

At the jetty, from left to right ; Araucano and submarines, destroyers Serrano, Requelme, Alden, Videla ; H.M.S. Ereder.

of 25, he will have served 35 years on the active list to qualify for full pension. He is liable to pay a small income tax on his pension.

CHILE'S NAVAL SCHOOL.

Situated on top of a hill surrounded by trim lawns and well-kept gardens, and commanding a fine view of Valparaiso Bay, stands Chile's Naval College—the Dartmouth of South America. This imposing building, commanded by Rear Admiral Luis Munoz Naldes, holds to-day 207 cadets, all fit, healthy, and happy young gentlemen. The original Naval College was built in the city of Valparaiso in 1818. It was re-built in its present situation in 1892, and new additions were erected in 1929 and 1936.

Boys are eligible for entry between the ages of 14 and 16, provided they have obtained a leaving certificate from their High Schools, have passed a series of mathematical papers set them by the Naval College, and been selected after a personal interview with the Naval Selection Board. They pass out at the age of 19 and go to sea.

The school fees are 2,000 pesos a year, paid by parents who have also to provide uniform for the first three years. The Government provides their uniform in their last two years. About sixty boys enter college on March 1 each year, but due to one reason or another (withdrawal by parents, business reasons, and health), about thirty complete the full five years. Each batch is in charge of an executive officer who is responsible for their discipline, their games, and the inculcation of the proper naval spirit during their courses. Civilian masters teach the usual subjects, mathematics, history, physics, electricity, and geography.

After their third year the boys who wish to become executive officers do a specialised two years' course in seamanship, gunnery, torpedo, and executive duties. The engineers also do a special two years' course in engineering, and occasionally a prospective paymaster does an accountant's course.

Boys who wish to take up flying when they leave college, besides receiving some technical training in their college days, spend one year at the Air Force headquarters at Santiago, and another year at the Quinteros Aerodrome, 14 miles from Valparaiso, to qualify for their pilot's licence. About six boys from the College join the Air Force every year.

The school year is divided into three terms and after each term there is a holiday. The first term is from March to June, at the end of which they receive 15 days' leave. The second period covers the winter months from June to September, when they are granted another 15 days, and the third period—the spring and summer—is from October to December, after which comes the long leave in January and February.

The school day, without being too strenuous, is well occupied. The present system is founded on the organisation initiated by Instructor Commander W. G. West, M.A., Royal Navy, who was a member of the Royal Naval Mission in 1930–31. The forenoon is spent in the classrooms, the afternoon is devoted to practical work

in the various well equipped seamanship, gunnery, torpedo, and engineering workshops. A well-stocked reference library is available for the Cadets, but the parents must provide them with standard works. Some of the textbooks are English publications translated into Spanish.

The recreational equipment of the College is also on a first-class scale. A new two-storied gymnasium was built in 1929. The upper story contains box horses, climbing ropes, rings, parallel bars, and a full-sized boxing ring. The lower floor contains a swimming pool, 26 yards long and 13 yards wide, with the latest system of chlorination and heating. Each "year" has its own study and recreation rooms where ping pong and indoor games may be played.

There is a level, full-sized football field, as well as a basket ball pitch within the College grounds. League competitions in these two games, and swimming contests, including water polo, are popular.

Once a week, generally on a Saturday evening, there is a cinematograph display of the latest pictures on a full-sized screen in the drill hall.

Every month there is a medical examination. If a cadet is indisposed he is discharged to the excellent sick quarters. If the illness is serious the patient is admitted to the nearby Naval Hospital.

A new kitchen with steam cookers and gas ranges was opened in 1936. The menu is ample and well cooked. Meals are served in a huge dining hall at tables that accommodate eight persons.

RATINGS.

There are 8,000 men in the Chilean Navy to-day, about 800 of these are conscripts who serve two years and then return to their shore jobs, but remain attached to the Chilean Naval Volunteer Reserve. The lowest rate of pay a man can receive is 300 pesos a month. Both officers and men, however, receive "gratification pay," equal to 25 per cent. of their salaries to compensate them for the low value of the Chilean peso. Those who are married receive a "gratification bonus" of 15 per cent., and all those who serve on board ships an additional 10 per cent. which is not paid to those on shore. After ten years' service a man may retire with a certain percentage of his salary. This percentage grows according to the number of years he serves above ten, and reaches full pay after twenty-five years' service.

Everything is done for the welfare of the seaman. The new Naval Hospital, up-to-date in drugs and instruments, with 140 beds, was opened ten years ago. A new hospital for officers on both active and retired lists, and their families, was to be built in 1938.

BOYS' TRAINING ESTABLISHMENT.

On Quiriquina Island is the boys' training establishment. It is situated about 6 miles from the dockyard, at the entrance to

Talcahuano Bay, and separated from the mainland by channels one, and one and a half miles wide. The captain of the naval training establishment is also in charge of the Island and part of his duty is to farm it.

In 1937 there were under training 260 boys between the ages of 17 and 19 years, and the system of training is similar to that at Shotley (H.M.S. Ganges). Some boys are volunteers; others are conscripts. Whether the two systems are to continue was to be decided in 1938.

Uniform is supplied by the Government; the teachers include Naval Officers, Warrant Officers, and Petty Officers. There are excellent recreational facilities, the boys show a good standard of football and basket ball. There is a fine bathing beach, a spacious gymnasium, and everything is done to make the boys happy. One was impressed by their smart appearance, fitness and good manners, discipline, and drill.

TALCAHUANO (CHILE'S NAVAL BASE).

When the Panama Canal was opened to shipping in 1914, the once great maritime port of Talcahuano, forty miles from the Schwager coalfields of Southern Chile, lost its world commercial significance, but still retained prestige among the navies of the New World as the Naval Station or *Apostadero* and main dockyard of Chile's Navy. To-day it is also the home of the various naval schools; gunnery, torpedo, and submarine, as well as being the submarine base. There are two dry docks, one for ships up to 7,000 tons, and another for ships up to 35,000 tons. All the machinery in the workshops is British made, and so fitted to undertake the various repairs of their British built ships, which are in the majority.

At the time of the writer's visit Admiral Juan T. Gerken was the Commander-in-Chief at Talcahuano. Captain Arturo Young commanded the naval dockyard, Commander Oscar Arrendondo directed the gunnery school, Commander G. Silva the torpedo school, Commander G. Toro was the officer commanding the submarine school and base.

THE GUNNERY SCHOOL.

The gunnery school was forty-five years old on December 2, 1938. It originated on board the cruiser Cochrane on December 2, 1892, under the presidency of Admiral Don George Montt, who was also a President of Chile. The school remained for 15 years in the Cochrane and as a consequence that ship is affectionately looked upon by the "G" specialists as the cradle of their naval gunnery. The school was transferred to the Esmeralda, later to the protected cruiser Blanco Encalada, thence to the Naval Barracks in Valparaiso, whence it was transferred to the former engineering school in Talcahuano, and eventually in 1928 to its present imposing buildings at that base.

Included on the staff of the school was Lieut.-Commander

Augustine Dagnino, Assistant Director, as well as three lieutenants "G" of whom Lieutenant H. R. Foxley was the senior. These officers, assisted by the chaplain (who besides his clerical duties also lectures on geography, history, arithmetic, and grammar), teach gunnery subjects to both officers and men.

The scheme of instruction includes a long course for lieutenants, three to six of whom are chosen every year to undergo a programme lasting eleven months, beginning in February and ending in December. The first ten months are spent on theory, the last month is spent on practical work on board the destroyer Condell. Finally there is a five-day examination in which candidates must obtain 65 per cent. to pass.

Twenty-five midshipmen undergo a four months' gunnery course every year, from March to July, which is followed by fourteen days' practical period on board the Condell.

There is also a series of courses for the lower deck. Four specially selected Chief Petty Officers undergo an eleven-months' course every other year for promotion to warrant rank. Other eleven-months' courses are taken by Petty Officers for promotion to Chief Petty Officers and by Leading rates for promotion to Petty Officer. On an average there are about half a dozen candidates for these courses. Shorter courses are taken yearly by rangetakers, by gunlayers, and by boys qualifying for Seaman Gunner. There are about 15 range-taker candidates, 25 to 30 gunlayers, and some 70 boys in these courses.

The present gunnery school at Talcahuano has a great reputation for efficiency, smartness, and *esprit de corps*. To maintain this high standard of efficiency the Instructors are chosen for their executive ability. The daily routine is based on clockwork regularity. Hands are called at 5.30, at 8 a.m. divisions are inspected by the Director-Commander. The forenoon is spent in lectures, the afternoon is devoted to practical work until 5.30 p.m. when work ceases. Lights are out at 9 p.m.

On Monday afternoons sports, such as football, basket ball, boxing, athletics, and rifle shooting, take place. On Wednesday afternoon there is infantry drill. On Friday afternoon the school is cleaned in preparation for the Director's rounds on Saturday. The week-end is free of all routine.

The school is rich in traditional relics, especially those of Lord Cochrane and the Esmeralda.

OTHER NAVAL ESTABLISHMENTS.

Attached to Talcahuano is a modern naval hospital re-built in 1930. In 1937 it was under the supervision of Lieutenant Cdr. Horacio Vio, and a staff of 14 naval doctors and 8 civilian specialists. The hospital contains about 100 beds. Besides the officer and his family and ratings' families, the doctors also attend the dockyard workmen—in all about 10,000 people.

There is a well-equipped Signal School about five miles outside Valparaiso.

PERU.

The Navy of Peru is small, but no South American nation is more "Navy proud." The naval headquarters are at Callao, the port of Lima—the capital of the country. The recent expansion in the personnel and the improvement in service conditions are largely due to the present Minister of Marine and Aviation, Captain Hector Mercado, assisted by his Chief-of-Staff, Captain Frederico Diaz Dulanto.

TRAINING OF OFFICERS.

The naval college, a group of imposing buildings, is situated at La Punta about a mile from the landing stage at Callao. It is commanded by Captain Alejandro G. Vincés, assisted by Captain A. P. Ernesto Gutierrez. A hundred and five midshipmen are educated at the college whose ages are between 15 and 17½. There are also 72 cadets between the ages of 11 and 13.

The classrooms where navigation, seamanship, gunnery, and torpedo subjects are taught are modern, and include the latest demonstration instruments and models for these subjects. The engineering workshop is also up-to-date. All text-books, instruments and uniform are supplied by the Government to the cadets free. Physical fitness and games receive due care and attention, and the huge gymnasium, with its horse boxes, parallel bars, punch balls, rowing machines, boxing ring, and swimming bath, are in charge of an expert American physical training instructor, a Mr. Curry from Los Angeles, California. The mud-baked parade ground is also used as a recreation ground for baseball, basket-ball, and association football inter-term matches.

The newly built Sick Bay includes four general wards, a fever isolation ward, bathrooms, operating theatre, a disinfecting room, a kitchen, and the latest drugs, instruments from Germany and America. Everything is spotlessly clean.

In the college library are mementos of past Peruvian admirals, and pride of place is given to the relics of their great naval hero, Admiral Grau.

The youngest cadet is paid at the rate of one solé (about 1s.) a week which is increased as he grows older. A young lieutenant receives 600 solés a month (about £30), but he is allowed to have his own private quarters in the city.

RATINGS.

The majority of the men, of whom 1,000 are recruited every half year, join for two years' service. To qualify for a pension they must serve for twenty-five years.

To-day everything is being done to make the service attractive and improve the well-being of the men. A new modern naval hospital with 200 beds for Petty Officers and men was built at a cost of 800,000 solés and opened a few months ago. The majority of the 18 visiting physicians and surgeons are in the Naval Volunteer

Reserve. In another year the authorities hope to build extra stories for the officers, and the women and children. An executive commander is responsible for the discipline, care, and maintenance of the hospital.

There is a great air of efficiency and keenness among the officers and men of the Peruvian Navy, who hope that the time is near for the replacement of their present complement—the two ancient light cruisers and destroyers, the four submarines, torpedo-boat, and two gunboats with more modern, efficient, and up-to-date craft.

ARGENTINA.

The present day Argentine Navy possesses ships of British, North American, Italian and German design and build. The destroyers purchased from Spain were originally built in Britain.

Their new ships are British. The new 7,000-ton training cruiser *La Argentina* (which will replace the forty-year old *Sarmiento*, an auxiliary training ship called after President Sarmiento who founded the original Naval Academy in Buenos Aires), was built by Messrs. Vickers-Armstrong together with three destroyers. Messrs. John Brown & Co. and Messrs. Cammell Laird & Co. have built two destroyers each. All were due out in August, 1938.

Besides the *Argentina* and seven destroyers, whose names are Buenos Aires, San Luis, San Juan, Misiones, Santa Cruz, Entre Rios, and Corrientes, seven small minesweepers have been constructed in the Argentine, four at the Naval Base at Rio Santiago, and three by Messrs. Hansen and Puccini in Buenos Aires. Each has a displacement of 520 tons, fitted with Diesel engines capable of a speed of 14 knots, and carry 3.9-in. guns. These have replaced the German "M" class minesweepers purchased in 1922.

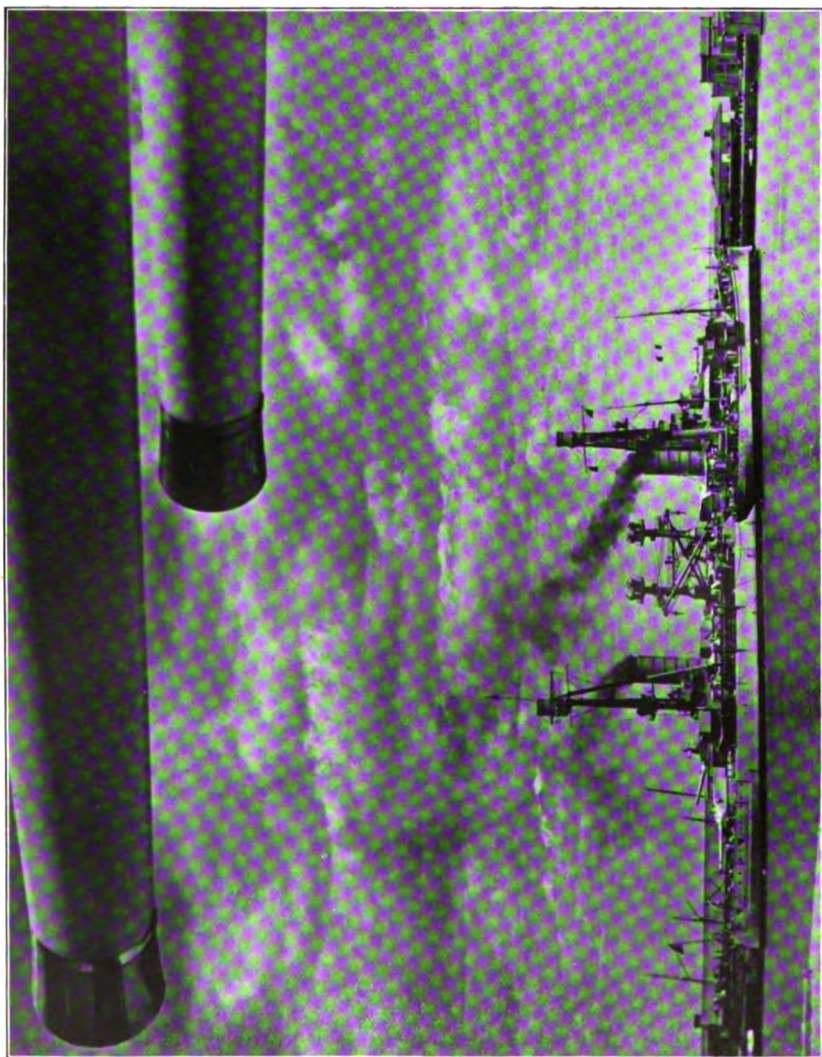
As further examples of the extensive reconstruction now in progress a new naval school is being built on the Island Rio Santiago to replace the present one which has been in existence for twenty-five years; as well as a repair yard for river craft. And a dockyard is being largely rebuilt capable of accommodating and constructing ships up to 8,000 tons, at Puerto Belgrano. In this port 3,000 civilian workers are employed, and paid by the hour.

In the Navy to-day there are 950 officers and about 10,000 men.

OFFICERS.

The Argentine naval officer is an intelligent, tactful, high-spirited gentleman, with great pride in his Service. The majority speak several languages, and English is spoken much more often than formerly.

Officers do 2½ years at sea and a similar spell ashore. There is a magnificent new hotel built for the young married officers and their wives at Puerto Belgrano, and in the surrounding district delightful detached villas are occupied by the senior officers and their families.



ARGENTINE BATTLESHIP MORENO AT PUERTO BELGRANO.

CONDITIONS OF ENTRY.

At the end of his third year in high school a boy must pass an examination to be accepted for entry to the "Escuela Naval Militar" in Rio Santiago, an island formed by the Rivers Parana and Uruguay at the estuary of the River Plate which is, at this spot, 60 miles in width, and situated about $1\frac{1}{2}$ hours by train from Buenos Aires. He is now about 15 years old. He remains for four years at the Naval School and leaves at the age of 19 to go to sea. Since the naval expansion scheme came into operation there are now about 100 boys for entry on January 1, which is the beginning of the official school year, but due to withdrawals because of family reasons or health, about forty pupils pass out at the end of their fourth year to sea.

The January to March term is for the new entry only; the real courses for the older boys start in March who have spent their previous three months in a short cruise in the Pueyrredon. The school breaks up in December for 15 days' leave.

PROMOTION AND PAY.

At the end of his time in the school (during which he has received 6 pesos a month), a cadet joins the training cruiser Argentina for one year; he now receives 30 pesos paper and 30 pesos gold, which is equivalent to 75 pesos a month. At the end of his time in the Argentina he becomes a midshipman, or *Guardia Marina*, holds the rank for two years, and receives 360 pesos a month. Next he becomes a sub-lieutenant, or *Alferez de Fragata*, for two years, and receives 420 pesos a month.

His next step is a junior lieutenant, or *Alferez de Navio*, for two years, and is paid 550 pesos a month. Then promotion to lieutenant, or *Teniente de Fragata*, for four years, and pay is 670 pesos a month. And after that lieutenant-commander, or *Teniente de Navio*, for four years, and receives 900 pesos a month. At the end of this time he is promoted to commander, or *Capitan de Fragata*, which he holds for three years at 1,200 pesos a month, and is then promoted to captain, or *Capitan de Navio*, receiving 1,600 pesos a month. After three years in that rank he is promoted to rear-admiral, or *Contra-Almirante*, at 1,900 pesos a month. and then follows by selection vice-admiral, or *Vice-Almirante* (2,200 pesos a month), to admiral, or *Almirante* (2,500 pesos a month).

Besides executive officers there are four types of officer—the mechanics, the electrical (these are trained in the Naval Academy), the torpedo and the naval constructors. When these two latter branches have graduated from the Naval Academy the torpedo officer spends one year in practical instruction in England, Europe, or North America, and the naval constructors spend from two to five years in either one of these countries obtaining greater experience. The officers from these four branches begin their careers with the rank of sub-lieutenant and end with the rank of captain.

Paymasters have the same rank, but start as midshipmen

(*Auxiliar Contador*). Surgeons enter from the Universities and start as first-class surgeons—*Teniente de Fragata Cirujano de Ira*—and can reach the rank of inspector—the equivalent of captain. There are 48 surgeons in the Argentine Naval Medical Service. There are 14 on the staff of the Naval Hospital at Puerto Belgrano. This hospital has had new blocks attached to it and the total accommodation now numbers 320 beds with first-class, ultra-modern operating theatres, X-ray plant, laboratories, ophthalmic, ear, nose, and throat, and radio-therapy departments.

In 1937 the aviation curriculum was also included in the naval school syllabus. Those who wish to become aviators must first do one to two years general service at sea before entering the Aviation Academy at Puerto Belgrano, where they remain for 1½ years' training before graduating as pilot. About ten candidates each year take up aviation. These receive 20 per cent. extra pay.

In 1936 the Marine Corps (founded on the North-American system) was introduced. Candidates are selected from the Naval Academy. To-day there are 60 marine officers and 2,000 men. Each battleship has a complement of 2 marine officers and a detachment of 120 marines. Each cruiser carries 1 marine officer and 80 marines. Their uniform is cut on the North-American pattern. The corps is smart, of good physique and soldierly bearing, and look a fine body of men.

RETIRED PAY.

Under the pension scheme for the Argentine naval officer, his time for pension counts from the day he enters the Naval Academy, and it is possible for an officer to have more years to count towards his pension than he has actually served. He receives two years for every one year he serves in :—

- (a) Aviation Corps.
- (b) In national emergency, e.g. revolution, etc.
- (c) Submarines.
- (d) In survey work south to 42°.

An officer who has twenty years' continuous service and serves for seven years in (a), (c), or (d)—(b) is happily rare—can count fourteen years, which gives him thirty-four years towards pension emoluments. But he must have fifteen years' continuous service first, before he is able to reckon his double time.

When he has thirty years' service to his credit an officer may retire on the full pay of the rank that he holds on retirement. With fifteen years' service, if an officer is retired—for instance, on account of health—he receives 50 per cent. of the full pay of his rank. From fifteen to thirty years' service, the rate of retired pay varies according to a scale laid down, from 50 per cent. up to 100 per cent. Officers may volunteer to retire, if they wish to do so, when they have twenty years' service.

If an officer dies his family receives 50 per cent. of the retired pay, e.g. at the end of eighteen years' continuous service an officer

receives 60 per cent. of his retired pay ; if he dies his wife receives 80 per cent. of that amount.

RATINGS.

Conscripts do two years and enter in the month of January, between 2,000 and 3,000 join each year (the conscript in the Army does one year). Conscripts are paid 15 pesos a month.

Sailors 2nd class receive	80 pesos a month.
„ 1st class receive	120 „ „
Leading Rates 3rd class receive	160 „ „
„ „ 2nd class receive	200 „ „
„ „ 1st class receive	250 „ „
Petty Officer 3rd class receive	300 „ „
„ „ 2nd class receive	350 „ „
„ „ 1st class receive	400 „ „
Chief Petty Officers	500 „ „

The Argentine sailor impresses one by his alertness. They are of good physique and look fit. They are smart and wear their uniform well. The ship's programmes allow them three weeks at sea and three weeks in harbour. When at the base a man is allowed ten days local leave.

A VISIT TO PUERTO BELGRANO.

In January, 1938, the following ships of the Argentine Navy under the Commander-in-Chief, Vice-Admiral Leon Scasso, were present at Puerto Belgrano.

Battleships—Moreno and Rivadavia.
 Cruisers—25 de Mayo and Almirante Brown.
 Destroyers—Tucuman, La Rioga, Mendoza, Cordoba, Jujuy, La Plata, Cervantes, Catamarca, Juan de Garay.
 Submarine—Salta.
 Minesweepers—Bathurst, Parker, King, and Thorne.
 Tugs—Drummond, Scaver, and Robinson.
 The Belgrano and submarines were at Mar-del-Plata.

There have been many English names in the Argentine Navy of late years.

At sea various gunnery, torpedo, and fleet exercises are carried out. These cruises take place in Southern waters sometimes as far as Cape Horn. During the year longer cruises may be undertaken when the fleet may be away for forty to forty-five days. In 1937 the fleet visited Chile and Peru, and the Moreno went to the Coronation. The majority of the ships burn oil which is obtained in the country.

BRAZIL.

The Brazilian Navy was founded on the occasion of the Independence of Brazil on September 7, 1822, by the first Emperor Don Pedro I, Minister Jose Bonifacio, and Admiral Luiz da Cunha Moreira. Lord Cochrane was appointed the first admiral of the Brazilian Fleet. The first ships were Pedro I, Ypiranga, Maria da Gloria. At the present time (1937-38) the Commander-in-Chief is Rear-Admiral Carlos Augusto Gaston Lairgne. His Chief of Staff is Captain Adalberto Landim.

The following ships comprise the present day Navy :—

Battleships—Minas Geraes, Sao Paulo.

Cruisers—Bahia, Rio Grande do Sul.

Destroyers—Rio Grande Do Norte, Piahyba, Alagoas, Sergipe, Santa Catharina, Matto Grosso, Maranhao,

and other small ships including six modern minelayers and two escort vessels. There are also two modern gunboats stationed in the Amazon. Three new destroyers of 1,500 tons each, one building at Rio de Janeiro, material supplied from the United States—it is unobtainable in Brazil. Three more new destroyers are building in England.

During the Great War ships of the Brazilian Navy were employed in the Mediterranean.

OFFICERS.

The rank of officers in the Brazilian Navy is the same as in all other world navies : admiral, vice-admiral, rear-admiral, captain, commander, lieutenant-commander, lieutenant, lieutenant junior grade, ensign, and in the Naval Academy—midshipman. In Portuguese : *Almirante, Vice-Almirante, Contra Almirante, Capitao de Mar e Guerra, Capitao de Fragata, Capitao de Corveta, Capitao Tentente.*

Pay depends on many factors such as length of service, etc.

For a Vice-Admiral	4.500 s. 000
„ Rear-Admiral	4.000 s. 000
„ Captain	3.600 s. 000
„ Commanders	3.100 s. 000
„ Lieutenant-Commanders	2.600 s. 000
„ Lieutenants	2.100 s. 000
„ Junior Lieutenant	1.600 s. 000
„ Ensign	1.300 s. 000
„ Midshipmen (<i>Guarda Marinha</i>)	1.000 s. 000

Engineers, doctors, and paymasters are paid the same amount according to their rank.

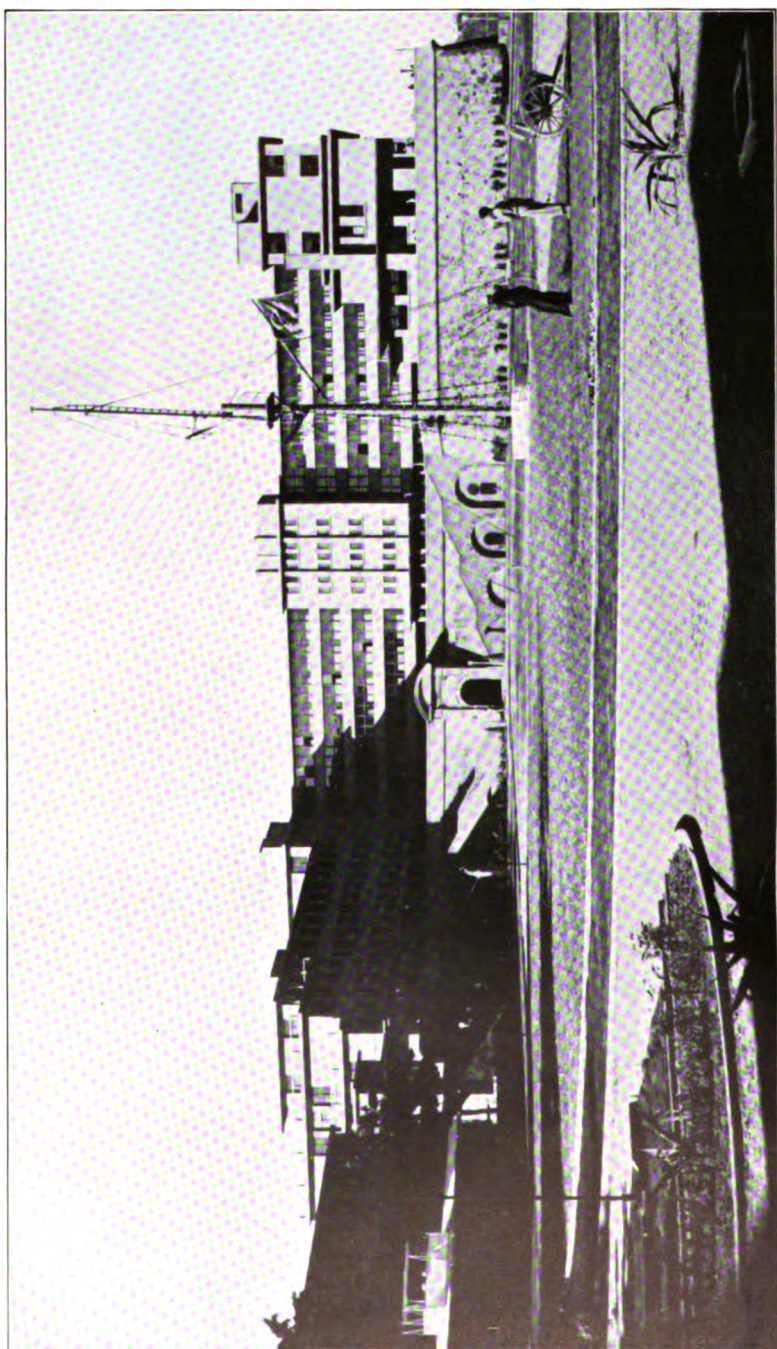
RATINGS.

Candidates are received between the ages of 15 to 17 on a voluntary system from about six different schools. Apprentices receive 5 s. 000 a month. Then there are the various classes, e.g. :

Marinheiro—3rd class
 2nd class
 1st class
 Cabo Sargento—3rd class
 2nd class
 1st class
 Sub-Official.

Here again pay depends on many factors, a sub-official receives about 1.200 s. 000 a month.

On retirement a “retirement pay” is received depending upon the rating or rank of the individual. Leave is granted at a minimum of 15 days a year.



THE NAVAL SCHOOL OF BRAZIL, ISLAND OF VILLEGaignon.

There are four dockyards with a total employment of 6,000 men, and up-to-date naval hospital at Corbas Island.

There is an American Naval Mission in Brazil for the purposes of instruction, consisting of eight officers and 5 Chief Petty Officers.

BRAZIL'S NAVAL SCHOOL.

The North-American Naval Mission, at present working in co-operation with the Brazilian Navy in Rio de Janeiro, has had great influence in shaping the efficiency of the personnel. Even the Brazilian naval officers' uniform is cut on the same pattern as the American naval officer, and now the new naval school, opened by H.E. President Getulio Vargas on June 11, 1938, is run on the same lines as the American Naval Academy at Annapolis. The director of the *Escuela Naval* is Admiral A. Vieira de Mello.

The naval school of Brazil originated from the Marine Academy of Portugal created in the year 1779, on the occasion of the visit of Don Joao VI to Brazil with his court and the administration of the kingdom. The academy was transported to Rio de Janeiro by decree of May 5, 1808, and installed in the building of the monastery of Saint Bento making use of the instruments, books, models, machinery, letters, and plans which were in use in the Academy in Lisbon. The first commander was Jose Maria Dantes Pereira.

In the year 1839 the marine academy was transferred to the vessel *Pedro II*, where it functioned until February, 1894, when it was reorganised, being renamed "Marine School" and was transferred to a building in the *Rua de Prainha*, where it remained until 1867.

In 1883 the Marine School was installed on the Island of the *Enxadas* (with the exception of 1914 to 1920 when it was at *Baptista das Neves*) in the bay of the *Ilha Grande*. In April, 1938, it was installed in the new buildings on the Island of *Villegaignon*.

Until 1913 there were two separate courses for executive officers and engineer officers. Since 1914 these courses are amalgamated with a view of creating one class of officer—which has been done up to the present.

A VISIT TO THE ESCUELA NAVAL.

The school is about 15 minutes' taxi ride from Rio's main Avenida Rio Branca, and connected to the mainland's civil airport by a bridge. The buildings, of grey ferro-concrete, look imposing and ideally situated; they were designed by a young Brazilian architect. Even in the height of summer there is a cool sea breeze, and huge windows from floor to ceiling allow plenty of light and ventilation. There is nothing ornate about them. All the wood used was grown in Brazil.

In July, 1938, the school contained 280 cadets whose ages ranged from 15 to 18. There were thirty-three naval officers on the staff; their task is to inculcate naval traditions and the spirit of leadership, as well as to instruct in seamanship, gunnery, torpedo,

and executive duties. There were also several civilian professors who teach languages, mathematics, and history.

The present school courses last five years. The first year is a preparatory course and the next four are called superior courses. At the end of the fifth year the cadet is appointed *Guarda Marinha*, when he serves one year in the training ship. At the end of that year, provided he passes the regulation examinations, the *Guarda Marinha* is promoted to second lieutenant.

Each year of studies is divided into two periods, the first from April 1 to July 31, and the second from August 24 to December 24. In each period the cadets are subjected to three written and one oral test on their subjects. The results of these four tests of each year serve to calculate the average of each period. The annual result of each cadet is obtained by adding the average of the first period to twice that of the second period and dividing by three. The final minimum for passing is four. In the period from January to March the cadets make a "voyage of instruction" along the Brazilian coast. Those who do not obtain a satisfactory average go up for their examination in March. A cadet can only repeat one year during the course, and is then sent down from school if he does not pass on the second attempt.

There are class-rooms with tip-up chairs as in a theatre. Magic lanterns are used for demonstration purposes. The science laboratories, where practical physics and chemistry are taught, are fitted with tiled desks and troughs with hot and cold water. The torpedo, gunnery, and seamanship class-rooms have excellent models and the latest equipment purchased either from North America or Germany. Many of the text-books are printed in the college.

Groups of three cadets share a cabin. Each has his own bed, a wardrobe, and study desk. Every cabin has its own shower bath. All toilet towels are hung outside the cabins on bars along the corridors. This ensures cleanliness. In fact the whole place is spotlessly clean. Each cadet on joining is given a number consisting of three figures. The first number indicated his year and the last two his place in that year. Thus the owner of 947 is in his third year and occupies 47th place in it.

The cadets turn out at 6 a.m. in the summer and 6.30 a.m. in the winter. Lights are out by 10 p.m. They are allowed week-end leave subject to their behaviour and progress in studies, from p.m. Saturday to p.m. Sunday. Cadets in their senior year are allowed leave until 9 a.m. Monday.

Not only have they first class teaching and living spaces but their food and recreational facilities are excellent. Four square meals a day are cooked in perfect hygienic electric ranges and served hot. There is a magnificent gymnasium with a full-sized basket ball and volley ball pitch, boxing ring, parallel bars, indian clubs, and all the accoutrements to aid physical fitness. There is a 75 yards long open air swimming bath with plenty of room for water polo and six-a-side swimming relay teams. In addition sailing and boat pulling is taught every cadet and the surrounding stretch of water offers ideal training facilities for practical seamanship.

Nor are the lighter types of indoor amusement forgotten. There is a vast room with five full-sized tables devoted to ping pong, bagatelle, and billiards. And a modern theatre suitable for straight plays or talkies is capable of seating 1,000 people.

In case of illness or accident there are two medical officers on the staff. The sick quarters consist of isolation ward in case of fevers, surgical and medical wards, two operation theatres, examination rooms and offices. There is an excellent X-ray machine. A dental officer is attached to the sick quarters. Cadets undergo medical examinations before admission to the college and then every year while they remain at school. Their records are kept on a card index system.

In time the parade ground, round which the college is built, will be covered in its centre by a beautifully level grass lawn on the outskirts of which is a 440-yard cinder running track. There are also pits for long and high jumping.

Ceremonial parades and sports meetings are witnessed from a stand representing the bridge of a battleship.

Every member of the college looked fit, sunbronzed, and happy. July's winter days of bright sunshine and cold nights encouraged energy. Nowadays a great wave of physical training is breaking over Brazil in general and Rio in particular, and right in the van of this fitness campaign are the cadets of the Naval School.

CONDITIONS OF ENTRY.

Any boy in Brazil is eligible to enter the School provided he passes the entrance examination. But due either to family claims for business or other professions or ill health—about 60 per cent. graduate as naval officers and go to sea. But such is the college education that it stands the boy in good stead who has to make his way in civil life.

The cadets uniform and textbooks are supplied at reasonable rates by the Government, and the cost of his education to his parents works out about £3 a month.

There is an excellent liaison between the officers, civilian masters, and cadets. Even the sailors' quarters, the servants of the college, are the last word in comfort. Their rooms are high ceilinged and well ventilated as the rest of the college, the food is good and the canteen prices compare favourably with those of the cadets' canteen. Their dining-room has long mess tables and benches made of a marbled patterned composition, and palms in tubs gives the place quite a "winter garden" cheerfulness.

So well does the naval discipline fit the youth of Brazil that the traditions of the Navy are accepted without complaint or grumble. There is no irksome restraint. Cadets rose smartly to attention and saluted as officers passed by and then carried on with their game or book. Everyone looked fit and well and each one gave the appearance of serving in a "happy ship."

The present subjects taught at the Naval School are as follows :—

Preparatory Course . . .	Mathematics, Naval History, Portuguese, English, and Physical Training.
Higher Course	Analytical Geography, Descriptive Geography, Chemistry, French, and Navigation.
Second Year	Mechanics, Electricity and Wireless Electricity, Thermodynamics, and Generators.
Third Year	Alternating Engines and Turbines, Practical Astronomy, Trigonometry, Electrical Machinery, Armaments, Ballistics, Organisation of Artillery, Torpedos and Mines, Designs of Machinery (blue prints).
Fourth Year	Navigation, Armaments, Hydrography, Brazilian Constitutional Law, Naval History, Theory of Tactics at War.

Besides these studies the cadets work in the shops as blacksmiths, solderers, and model makers, and also in classes for instruction in Naval Signals.

URUGUAY.

As his ship enters Montevideo harbour the visitor may notice on the starboard bow a cruiser lying at anchor. This is the Uruguay, the sole representative of Uruguay's Navy. She was built in Germany thirty years ago, and this gallant ship together with five coastguard vessels and one survey vessel comprise Uruguay's Navy. The Uruguay makes an occasional trip to Rio de Janeiro and to the Argentine. In the Navy to-day there are 120 executive, 40 engineer, 10 medical, and 8 accountant officers.

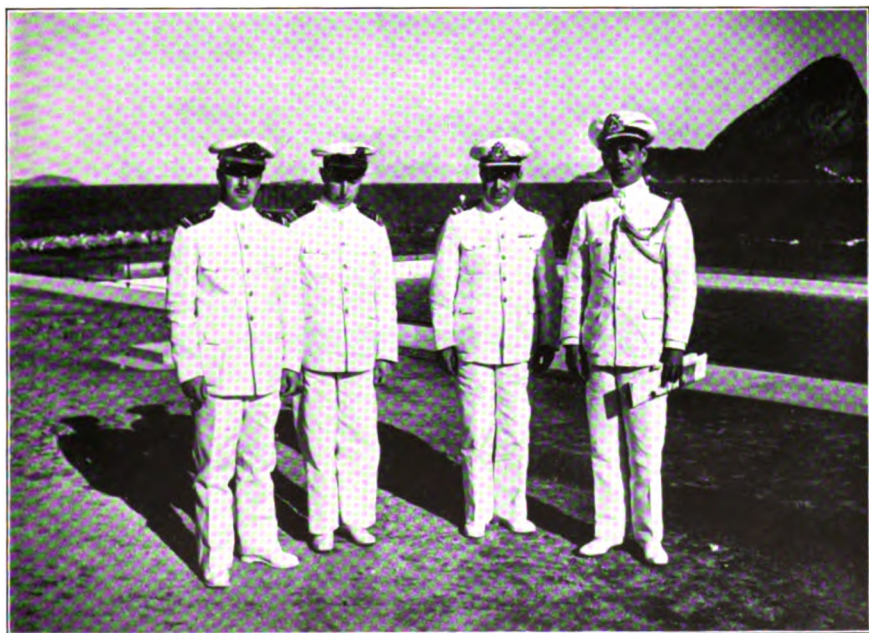
Yet it must not be inferred that the republic is not Navy proud—far from it. In the Escuela Naval overlooking a narrow street, situated about five minutes' walk from the modern Customs House, the naval tradition is inculcated by Rear-Admiral A. Juambetiz, assisted by Capitan de Fragata A. Aguiar, a Capitan de Corveta, three lieutenants, four second lieutenants, as well as twenty military and twenty civil professors. (The civil professors are paid at the rate of two pesos an hour's lesson and earn about 2,100 pesos a year, at the present rate of exchange of about 12 pesos to the £1—totals £175 a year.)

A VISIT TO THE NAVAL SCHOOL.

During the last week of August, 1938, there were 55 cadets on the books of the college. They are drawn by competitive examination from the various schools in Uruguay, but principally from Montevideo. They enter the college at the age of 15 and pass out as midshipmen after five years' tuition. If a cadet enters at the age of 16 he must still do his five years' training.

Besides the executive branch cadets are also trained as engineers. The paymasters enter from commercial schools direct to the Navy and do not go through the Escuela Naval. Doctors, of course, pass in from their medical school attached to the University.

The 55 cadets represent eleven in each year. They are paid 15 pesos a month, and receive their education at government expense.



THE NAVAL SCHOOL OF BRAZIL.

1. *The Quarterdeck.*
2. *A group of officers.*

Their parents pay for their uniform and books. The usual school subjects are taught: mathematics, geography, history, physics, chemistry, English and French, as well as the naval subjects—navigation, torpedo, and gunnery.

The school front looks on to a narrow street. The building encloses a square parade ground on which basket-ball, football, and gymnastic exercises take place. Various class-rooms, dormitories, messes, a library, recreation room, and a drawing-room overlook the square. In subterranean rooms are held the practical demonstrations in engineering, gunnery, and torpedo, the models being made in Germany and North America. From the flat roof of the two-storied school building an excellent view of the harbour is obtained. A nearby jetty is used by the liberty boats from the Uruguay, and at the other side of the breakwater are the huge quays for the world's merchant ships.

The school possesses an Infirmary consisting of six beds, a dental surgery; and attached to the college staff is a medical officer and a dental officer. Each cadet undergoes a routine annual medical examination.

The cadets were undergoing the usual half-term examination during the writer's short tour of inspection. They looked a fine, healthy, fit body of young gentlemen. All the studies and dormitories were spotlessly clean and to ensure that this will be always so there are forty naval ratings attached to the college as servants. They live in a special mess in the school.

Considering Uruguay's small coastline of about 400 miles and the curtailment of expenditure on naval services (for the country is very army proud and their new military academy is a superb building) there is a great spirit of *esprit de corps* among the naval personnel. In the various civic ceremonial parades the naval cadets evoke rounds of applause for their smartness and efficiency. The present school building, now over fifty years old, is adequate. But in so modern a city as Montevideo with ambitious town-planning schemes being put into effect perhaps the Navy's patience and tenacity will be rewarded like that of their military brothers in the near future, by a new edifice and one or two modern warships.

J. C.

CHAPTER VIII.

THE SURVEYING SERVICE.

IN the year 1795 the Hydrographic Office came into being, and Alexander Dalrymple, a writer in the service of the Honourable East India Company, was appointed the first Hydrographer of the Navy. That there was need for such an office there is no doubt : ships were ill supplied with charts and as often as not these were procured privately ; it was said that at the battle of Quiberon Bay none of the available charts bore any resemblance either to each other or to the actual facts.

Dalrymple had performed the duties of Hydrographer to the Honourable East India Company for sixteen years, and no doubt viewed with concern the amount of public money provided for the new office, for it was considered that the total expenses would not exceed £470 per annum. It is interesting to compare this figure with the sum of over £180,000 which appears in the 1938 Estimates. To assist him, Dalrymple was provided with one assistant, one draughtsman, three engravers, and a copper plate printer. Of the engravers, one was Mr. John Walker, who later acted as assistant hydrographer to Captain Hurd and Admiral Sir Edward Parry ; Mr. Walker's sons carried on their father's work, and it was not until 1865 that their connection with the Hydrographic Department ceased. Dalrymple resigned in 1808 and was succeeded by Captain Thomas Hurd, R.N., who was associated with Captain Thomas Cook in Newfoundland and Nova Scotia.

Mention should be made of Captain Matthew Flinders, who was employed under the first two Hydrographers on surveys from 1795-1814 ; his promotion in these prosaic days would be considered meteoric, for he was a midshipman in the *Reliance* in 1795, a lieutenant in the same ship, and was promoted to commander in 1801 when he took command of the *Investigator* and sailed for Australia. From 1801-03 he was engaged upon surveys of Australia, and had the misfortune to be made a prisoner at Mauritius by the French during the Napoleonic wars, remaining a captive on the island for six and a half years. Eventually he was liberated in 1810, and on his return to England was made a post captain, but he only lived long enough to complete the drawing of his charts. Much of his work remains and is in use at the present time, and his name and memory are held in high esteem both here and in Australia.

Captain Hurd's surveys include Brest Bay, Ushant, Falmouth, parts of the east coast of North America ; his great work, the

survey of Bermuda, which occupied nine years, for accuracy and attention to detail can seldom have been surpassed.

Hurd succeeded in bringing about the issue of a regular supply of charts for each naval station and in uniting the surveying service with the hydrographic office. Captains Mayne, Beaufort, and Smyth, as well as others, were employed on surveying work whilst Hurd was Hydrographer, and in 1814 two surveying ships, H.M. ships *Investigator* and *Sydney*, appeared for the first time in the Navy List. In 1823, when Hurd died, twelve separate surveys were in progress, directed from ten of H.M. ships and two hired vessels, and embracing Australia, Africa, British Isles, Canadian Lakes, West Indies, Newfoundland, and the Mediterranean, the officers in charge including Captains W. Owen, Bayfield, Franklin, Vidal, and Bullock.

Special mention should be made of the work undertaken by Captain W. Owen, afterwards Vice-Admiral. His stupendous work on the coast of Africa is, even in these days of steam and other more recent scientific aids, a revelation, while his unflagging zeal and tremendous energy overcame all difficulties, of whatever nature, which arose. Owen was captured by the French in 1808 and remained a prisoner in Mauritius with Flinders until 1810. It was not until 1815, however, that he actually started his surveying career. He was then a post captain, and after working on the Canadian lakes and in the Hydrographic Office, was in 1821 appointed to command the *Leven*, with the *Barracouta* under his orders, for the survey of the east and west coasts of Africa and Madagascar.

The work occupied him for five years, and the toll of life was very heavy. Admiral Washington in his report of the Progress of Geography, 1837-38, remarks :

" This gigantic survey, embracing the east and west coasts of Africa from the Isthmus of Suez round by the Cape of Good Hope to the Pillars of Hercules, may be said to have been drawn and coloured by drops of blood. Twice did Captain Owen change his whole crew and officers ; those accomplished surveyors Captain Boteler and Skyring, fell as sacrifices during his progress, and now, in the hour of conclusion the crews of *Etna* * and *Raven* * have all but shared the same fate."

No less than 30,000 miles of coast were charted and 87 charts and plans prepared. Owen must have suffered severely at times, but his dogged perseverance and the loyal support of his officers and men enabled him to pursue his task to its successful conclusion. Much of his work still stands as a fitting monument to a naval officer who in his lifetime received scant recognition of his work.

Rear-Admiral Sir Edward Parry was appointed Hydrographer in 1823, and with two breaks, during the first of which he led an expedition to the North Pole in the *Hecla* and *Fury*, and in the second in the *Endeavour*, over the Spitzbergen ice-fields, held office until 1829. Eleven ships were employed and four surveys were conducted in hired vessels. It is interesting to note that one of the ships was named *Echo* and that almost a hundred years later the use of echo sounding apparatus came into general use. During Sir Edward Parry's term of office Captains Beechey, Copeland,

* Two other vessels also employed on surveys on the West Coast of Africa.

Mudge, Denham, Barnett, R. Owen, James C. Ross, and Moresby were engaged in the conduct of surveys in various parts of the world.

Rear-Admiral Sir Francis Beaufort was appointed to succeed Sir Edward Parry in 1829. He found a mass of unedited material in the office and set about reorganising the whole department at the Admiralty and the surveying service afloat. Beaufort's surveying experience had been of no great length, but he had a sound knowledge of hydrography and in other spheres was regarded as one of the most able men of science in the country. He was fifty-nine years of age when he took office and was in his eighty-first year when he retired. It is difficult to exaggerate the value of Beaufort's work. He seems to have been all things to all men and was equally ready to praise good work or to blame what he considered ill done. His prestige was tremendous and he was for years the most eminent member of his profession.

The Hydrographic Department and the Surveying Service both prospered under Beaufort's guidance. The surveys afloat had hitherto been poorly provided for, but Beaufort changed all that; the staff and accommodation of the department were increased and reorganised and before long an enthusiastic group of officers became associated with the surveying branch of the Navy. FitzRoy was sent to South America, Belcher and Kellett to South America and Mexico, Vidal and Denham to the west coast of Africa, Blackwood and Owen Stanley to Australia and New Zealand, Sullivan to the Falkland Islands, Bate to Palawan, Stokes and Drury to New Zealand, Collinson to China, Owen and Barnett to the West Indies, Bayfield and Shortland to the St. Lawrence and Nova Scotia, Spratt and Graves to the Grecian Archipelago, while Hewett, Beechey, and others were employed in Home Waters.

It is impossible in a short article such as this to pay tribute to the surveys done by each individual and it is difficult to make an impartial selection when the work was of so high an order, but mention of that done by the *Beagle* under Captain FitzRoy, with Charles Darwin as scientist, cannot be omitted; not satisfied with the progress of the surveys for which he was responsible, FitzRoy purchased vessels locally and employed them as he thought fit. Of the remainder, Barnett in the West Indies and Sullivan in the Falkland Islands had probably the hardest time, while the surveys of Spratt and Graves are in daily use to this day.

Not long ago an American surveying vessel was employed upon a survey of that wonderful harbour, Malampaya Sound, Palawan Island, of which the original survey was executed by Captain Bate in the *Royalist* in 1850. An enquiry from a British officer as to the reliability of the *Royalist's* work met with the reply that it was admirable and that only one small shoal of any consequence had been missed.

It must be remembered that nearly all surveys until 1860 were conducted in sailing vessels and that the first steamboat was not brought into use for surveying purposes until the year 1869. Accounts of the dangers and difficulties, though in fact taken as

being all a part of the day's work, make interesting reading ; all too often a ship would be blown off her surveying ground and have to tack up to it again ; boat work was generally unpleasant and frequently dangerous ; there were no sounding machines until 1880, but the laborious task of getting deep-sea soundings and recovering the lead were happily seldom necessary. Good leadsmen in those days were essential, and it is safe to assume that every officer and man was an adept. When one examines an original survey of this period one is at once struck by the number of soundings obtained and by the regularity of their distribution ; seldom indeed was a dangerous rock or shoal missed, and the accuracy of most of the coastline and soundings has to be seen and compared with modern surveys to be believed. The way in which shoals were located had something uncanny about it, and it is seldom that a fault can be found in any surveys completed in Beaufort's time.

The reputation for thoroughness, accuracy, and, be it said, long hours of work may be traced back to Beaufort's influence and example ; it has often been said, sometimes in jest, that " no surveying day is too long," and it might with equal truth be said that whilst Beaufort was Hydrographer no day at the Admiralty was too long for him.

" War is the surveyor's opportunity," wrote a well-known authority many years ago, and whether the context of these words is used in the sense that war presents an opportunity for showing the value of the surveying service or, as has often been the case, the opportunity for exploring the coasts of enemy countries, it is none the less a true statement of fact. Nearly every campaign has found the surveying officer in request ; during the Russian War of 1856 Sullivan in the *Lightning* was appointed head of the surveying and pilot service in the Baltic, but so little was his value at first realised that his ship was employed as the squadron beef boat. Opportunity to prove his worth soon presented itself, and at a later date he had the satisfaction of leading the Fleet through the Ango Channel, Aaland Islands, which he had previously surveyed. During the First and Second China Wars surveyors were much to the fore, and in the latter Captain Bate of the *Actaeon* was killed during the attack on Canton.

The amount of coastline charted and the area of the oceans and seas sounded during Beaufort's time was prodigious ; in spite of poor materials and slowness of transport this may almost be regarded as the hey-day of hydrographic surveying. A more enthusiastic body of officers it would be hard to imagine, and each seemed to be inspired by a common ideal to get on with the work at all costs ; long commissions were the rule, and in some cases officers were employed for year after year in the same part of the world. Barnett served for eleven years successively in the *Thunder* as lieutenant, commander, and captain, and was for twenty-two years employed surveying in the West Indies ; small wonder that after reaching the age of forty-eight he was not again employed. Vice-Admiral T. A. B. Spratt, C.B., F.R.S., was from 1832-63 continuously employed on surveys in the Mediterranean and passed from midship-

man to post captain during this time. Finally, Rear-Admiral A. L. Mansell spent no less than thirty-two years of his life on the same work.

About the middle of the nineteenth century steam was beginning to come into use and ships were able to move about with more freedom ; but boats were still manœuvred either under oars or sail and survey work was still slow in consequence. With the introduction of steamboats in 1869, followed in 1878 by the installation of the first Lucas sounding machine, impetus was given to the work and progress of individual surveys became sensibly more rapid.

Before leaving the period during which Sir Francis Beaufort was Hydrographer the following extract from a letter written to that eminent naval surveyor Sir Edward Belcher ought to be quoted as showing the type of man the Hydrographer was :

“ Your last letter of 1845, is really all Hebrew to me, ransoms and dollars—queens—treaties and negotiations. What have I to do with these awful things ? they far transcend my limited chart-making faculties, however well-suited they may be to Admiralty Lords, to Commanders-in-Chief, to Governors of Colonies, and to *you* ; and with them, my good friend, you must arrange your diplomatic enterprises, and to them you must look for applause. Fortunately the Board have not asked for opinions, which I beg leave to reserve for affairs of soundings, angles, and other humble things of that kind. That you may have been doing good service to the country I will not deny, but the harvest I look for at your hands does not stretch beyond the reach of a deep sea line ; and all the credit I crave for you, and through you, for myself, must be won in the kingdoms of science, and reaped in hydrographic fields.”

The last sentence of this letter clearly expresses the needs of all those who have been entrusted with the charge of the Hydrographic Department.

In 1855 Rear-Admiral John Washington succeeded Admiral Beaufort at the Admiralty. It was not until 1841 that Washington received his first appointment as a surveyor, and for the majority of his surveying career he was employed on the east coast of England in the North Sea, but his work had been unusual in some respects ; he is probably one of the few naval officers who ever made the journey from Valparaiso to Buenos Ayres on horseback. He was an accomplished linguist and was an authority on harbour works ; his recommendations regarding the works at Harwich were acted upon and have since proved to be entirely justified.

It was due to Admiral Washington's interest that the status of the old “ Masters R.N.” was improved ; the rank of Master was abolished as a separate class and was replaced by that of Navigating Officer.

During the period 1855–63 surveys were being conducted in China, the British Isles, North America, the Mediterranean, Fiji, and the River Plate, and in addition to those officers already named Captains G. A. Bedford, G. H. Richards, H. C. Otter, and Commanders Parsons and Orlebar are particularly deserving of mention. Admiral Washington died at Havre while still Hydrographer, and was succeeded by Captain (afterwards Vice-Admiral Sir George) Richards.

Like many other distinguished sailors, Richards was born in

Cornwall, and entered the Navy in 1838. He served under Sir Edward Belcher in the Pacific, and later in China he saw service against the Chinese, being invalided from Macao in 1841. Subsequently he was employed in New Zealand, Vancouver Island, the Pacific, and other parts of the world on important surveys, but the great majority of his work was undertaken in the neighbourhood of British Columbia. The most important occurrence of his term of office was the planning and despatch of the Challenger Expedition under Captain (afterwards Admiral Sir George) Nares. The Challenger left England in 1872 and her well-known voyage lasted until 1876. Surveys were continued in various parts of the world under, amongst others, Parsons, Pender, Becher, and Reed.

In 1874 Captain F. J. O. Evans was appointed Hydrographer ; most of his practical surveying was done between the years 1841 and 1855, and during this period he was engaged on work in the West Indies, Australia, New Guinea, and New Zealand.

A good deal of oceanic work was done during Evans' time and much attention was directed towards the surveys of isolated islands, coral atolls, and so on. Alfred Carpenter, Pelham Aldrich, Tizard, Bedwell, Vereker, George Stanley, and Wharton were his chief assistants, and each in his particular way added something substantial to the tale of hydrographic achievement. Possibly Vereker's work, although unsigned, is more familiar than that of others, for all the beautiful and accurate views which for many years appeared, and in some cases still appear, on the charts of the British Isles were engraved from his original drawings.

In August, 1884, Rear-Admiral W. J. L. Wharton became Hydrographer, and continued as such until August, 1904. Wharton began his surveying career fairly early in life and was also an experienced Arctic explorer ; it was on one of his Arctic expeditions that he lost the use of his right hand, which was badly frostbitten. His work, both at sea and at the Admiralty is still within memory of living men and ranks second only to that of Beaufort, with whose memory his own is perpetuated by the Beaufort and Wharton Testimonial, awarded annually to the officer who passes the best examination in navigation and pilotage for the rank of Lieutenant in the Royal Navy.

It was during Wharton's time that increased attention began to be given to the need for detailed surveys whenever fresh work was undertaken. At the time he took office the oceanic charts were literally strewn with navigational dangers, the real existence of many of which was doubtful ; and it became necessary thoroughly to examine afresh all reports of this nature. The result was that a large number of these dangers were clearly shown not to exist and they were expunged from the charts ; this led to the re-examination of some already executed surveys, and with the advent of deeper-draught vessels much resurveying became necessary. Moreover, it became evident that if the hydrographic surveys were to compare and be assimilated with land survey work, the methods of triangulation employed afloat would have to be improved. New instruments were an obvious necessity and an improved technique combined

with the latest appliances available gave rise to an increased output in material, and eventually to surveys far more reliable than had hitherto been possible.

Wharton himself was a first-rate hydrographic surveyor; he had wide vision, great determination, and was regarded as an authority on all matters connected with his profession; he died at the Cape of Good Hope in 1905 whilst attending a gathering of the British Association.

During Wharton's period of office what may be called the "old-time surveyors" gradually passed away and were replaced by officers who had had their original training in the *Britannia* at Dartmouth, and who volunteered for surveying at an early stage in their career. Many of these were above the average as mathematicians; to this day the triangulation of the east coast of China, which was executed by Captain Osborne Moore, is the only satisfactory work of its kind that has been done in that part of the world. Archdeacon, A. M. Field, and H. E. Purey-Cust were all in charge of surveys at different times under Wharton, and a very large amount of work was undertaken in all parts of the world. About the year 1882 the first authoritative work on hydrographic surveying was published by Wharton himself, and although at a later date this was re-edited by Admiral Field, it was not until a few years ago that a new standard work on the subject became really necessary.

Sir William Wharton was succeeded by Captain (afterwards Admiral Sir Mostyn) Field, and like his predecessors, the new Hydrographer was elected a Fellow of the Royal Society; he was, in fact, the last to enjoy this distinction, possibly because the term of office of Hydrographer was at that time limited to five years. In 1909 Admiral Sir Herbert Purey-Cust became Hydrographer and was succeeded in 1914 by Captain (afterwards Admiral Sir John) Parry.

The period from 1904 to 1914 was one of steady progress in hydrography. Three almost new sloops were converted for surveying in this period, and one new ship was commissioned which had been built for the purpose.

The European war brought all but essential surveying in Home Waters to a sudden stop, and the whole of the energies of the department and of the surveying officers afloat was devoted to work immediately necessary in connection with hostilities. A special surveying unit was despatched to the Dardanelles with the necessary printing machinery, and for three years a small subsidiary Hydrographic Office operated successfully in the eastern Mediterranean. In other operational areas surveying officers were attached to the staffs of the various Commanders-in-Chief, where their services were of great value, particularly in matters connected with minelaying, bombardments, and indirect fire. At the beginning of the War there were fifty-five surveying officers serving afloat; of these seven lost their lives. Every retired surveying officer still capable of active service was employed and twenty-one received decorations for war service.

Progress in hydrography is necessarily slow, but during the last twenty years the advance made in the methods of hydrographic

surveying and improvements in instrumental equipment have been most marked. At the end of 1913 surveys were being conducted in eight ships in various parts of the world ; all were coal-burning and two were equipped with sail power as well ; all had one or more steamboats and were provided with wire sounding machines, the usual special surveying stores and instruments.

Up to this date the hydrographic surveyor had as a rule aimed only at the provision of triangulation data, controlled by astronomical observations, which, while sufficiently accurate for all practical purposes of navigation, could not be regarded as comparable with the class of triangulation undertaken by the land surveyor. Theodolites reading only to the nearest minute of arc are not conducive to great accuracy in angular measurements, neither are astronomical positions derived from the travelling rates of chronometers comparable with those that can be obtained by modern methods. It may seem strange that the experience of the War should have had something to teach the surveyor ; but it had. There is little doubt that the difficulties met with in the early days of a war, in adjusting, in connection with bombardments, hydrographic surveys to the more precise work carried out by the land surveyor, led to the adoption of better and more accurate instruments.

History repeats itself, and as in all wars the inventive genius of the nations engaged was working at high pressure from the year 1914. The return to peace conditions led to an examination of war-time progress with a view to extracting what profit was possible ; it was soon evident that much use could be made of certain war-time devices and that they could be brought to serve a useful purpose in various peaceful directions. Echo-sounding and taut-wire measuring apparatus are examples of modern advances ; and the perfection of the prismatic astrolabe, combined with the reception by wireless telegraphy of synchronous time-signals, made a revolutionary change in technique and greatly increased the accuracy of observations for geographical positions.

In the year 1938, of the eight surveying ships now employed by the Admiralty, four in home waters are modern oil-burning ships, each carrying, in addition to other boats, two surveying motor-boats. Of the ships employed abroad two are oil-burning and of the other two one is due to be replaced by an oil-burning ship, leaving H.M.S. Endeavour, built for surveying in 1912, as the only coal-burning vessel.

The Hydrographic Department has increased enormously in size during the last fifty years, and recently it has undertaken fresh commitments and responsibilities. As at present organised the department is divided into various branches dealing with particular parts of work. The Chart Branch is responsible for the compilation of all navigational and other charts ; these are engraved and printed at the Admiralty Chart Establishment which is located at Cricklewood. The Supplies Division, also at Cricklewood, attends to the distribution of charts, Sailing Directions, Notices to Mariners, and other hydrographic publications ; whilst the Sailing Directions,

Lights, Tidal, and Notices to Mariners Branches each deal with their special subject. It must not be forgotten, however, that each particular branch is working on the same major problem, and that the work of each is inseparably connected with the responsibilities of the department as a whole. The most recent addition to the department is the Naval Meteorological Branch, and by the time this article goes to press the management of the sales of Admiralty charts will have become a further responsibility.

J. A. EDGEELL,
HYDROGRAPHER.

CHAPTER IX.

THE MAKING OF A SEAMAN.

WITH the rapid expansion of the Navy, one of the most formidable problems is the provision of proper training. An indication of this expansion can be seen by comparing the figures for 1932, when the personnel was at its lowest, with those for 1938 :

	1932.	1938. (Estimated.)
Estimates	£50,164,453	£130,196,519
Average numbers borne	89,667	119,000
Seaman branch	32,073	39,943
Seamen boys under training . .	1,500	5,200
Ordinary seamen under training .	100	1,750
Recruiting :		
Expenses	£20,600	£60,000
Personnel	70	168

This problem of recruiting and training largely increased numbers of ratings is by no means a new one. It faced this country over a century ago in the war with France, to a lesser extent 50 years later in the war with Russia, and a quarter of a century ago before the Great War. "Between 1792, when war was declared, and 1812, when the naval forces reached their maximum, the number of sailors increased from 36,000 to 114,000. During the same time the numbers engaged in the Merchant Service increased from 118,000 to 165,000 men." * Our population was then only 18,000,000. At the height of the war the numbers borne on ships' books reached a total of over 147,000, including some 30,000 marines, a higher figure than at any subsequent date down to the outbreak of the Great War of 1914.

Despite bounties and the prospects of prize money, the Admiralty was driven to adopt various expedients. The traditional method was the press gang, for which the United Kingdom was divided into twenty-six stations. Each station was under a captain assisted by a number of lieutenants, who seized all likely looking men, and merchant ships were deprived of part of their crews.

With Napoleon a prisoner at St. Helena, the Fleet was reduced, the pressing of seamen ceased, and crews had to be obtained by voluntary enlistment. A detachment of marines was embarked, and the port flagship provided a quota of boys, but to obtain the seamen, by far the bulk of the crew, the captain had to open his own recruiting office, or "rendezvous," at some convenient public house or coffee house, near the dockyard gates. It took weeks or even

* "A History of the English People," Élie Halévy (1912).

months to complete a crew, according to the popularity of the captain, the station to serve on, and the supply of seamen.

One "rendezvous" met with approval later. Captain Harris in 1859 stated that Louisa Wafer, of the *Hard*, Portsmouth, "was really of very great service to the Navy; she entered men for several ships I have commanded and altogether she has obtained for the Navy 26,572 men within the last twelve years without considering the novices. She has always kept a respectable house and has prevented people of bad character entering it. I think that her services are worthy of the notice of the Royal Commission."

The Reform Bill of 1832 and the growth of education caused a great change in political power and public opinion, and although the power of impressment was safeguarded by legislation, there was much doubt whether it could be employed. If a war were popular press gangs might not be needed; if unpopular, no Government could be expected to face the political consequences of granting press warrants. An Act was passed in 1835 to limit impressment to five years. It is still on the Statute Book.

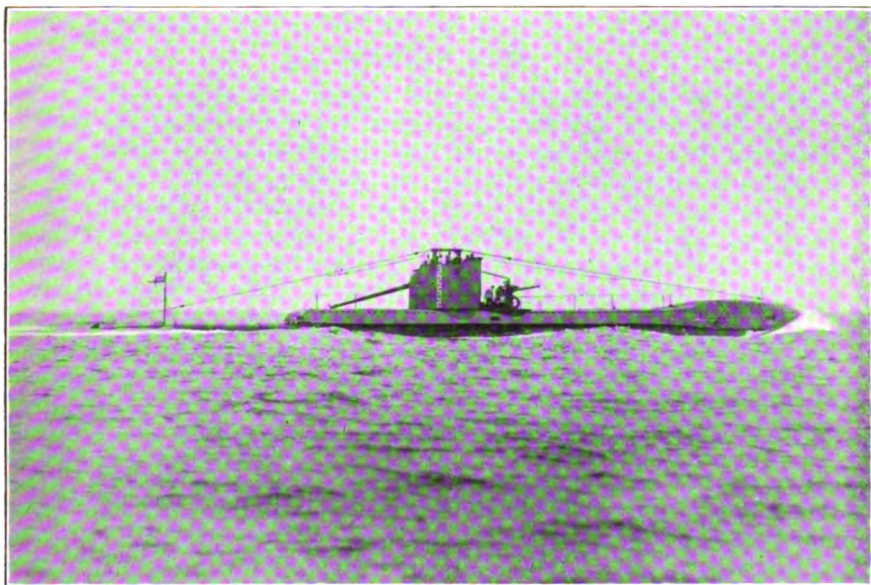
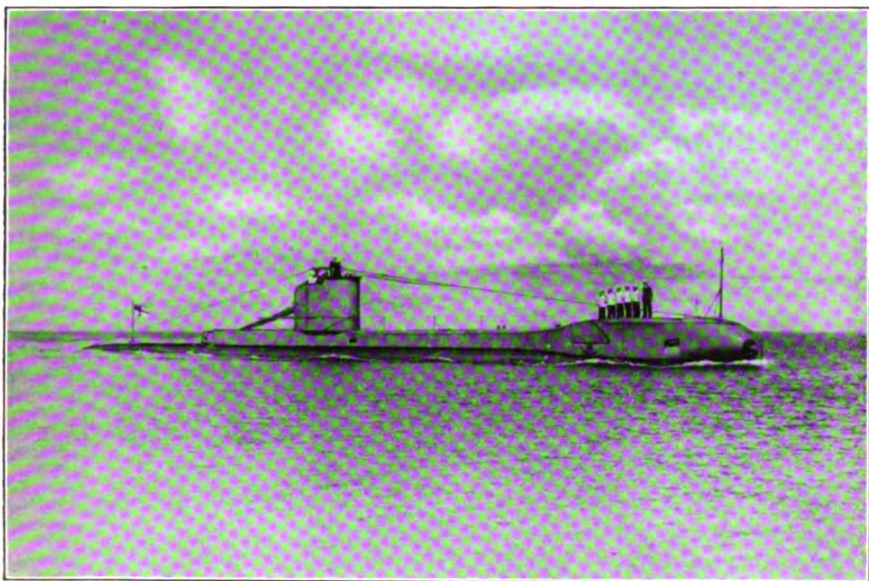
By 1850, penny postage was in operation, Morse had patented his telegraph instruments, Baron Reuter was organising the telegraph news agency which he founded a year later, a network of railways covered the British Isles, and the Cunard and P. and O. shipping companies had celebrated their tenth birthday. But the Navy had changed little since the days of Nelson. As Admiral Sir Charles Napier stated later: "Since the peace of 1815, we have contented ourselves with going from hand to mouth, and we have no regular system of manning the Fleet of any description whatever."

The practice was to enter men for particular ships, nominally for five years, but practically for the period of the ship's commission. Therefore, in addition to the manning problem, there was the equally important one of checking the constant wastage of trained men quitting the Service. Men trained at great trouble and expense were suddenly dismissed, and being unable to obtain re-admission, often sought employment under a foreign flag. For instance, higher pay in the American Navy attracted many men and some American ships were almost entirely manned by British seamen.

Only feeble attempts had been made to retain their services. In 1846 an Admiralty circular letter authorised a month or six weeks' leave with pay, on paying off, and the opportunity to join any man-of-war fitting out, at any of the ports, at the expiration of their leave. Three years later, following the Army practice, pay for good conduct badges was introduced of 2s. 4d. a month for each badge. Three badges could be gained by five, ten, and fifteen years' service respectively, as compared with six badges in the marines, with extra pay of 1d. a day each, after periods ranging from five to thirty years.

MANNING COMMITTEE OF 1852.

In 1852 the manning situation became such that a Committee of naval officers was appointed to investigate the problem. The two main questions were: (1) the possibility of establishing con-



1. H.M. SUBMARINE UNDINE.

Commissioned for service April 13, 1938.

2. H.M. SUBMARINE URSULA.

Commissioned for service, October 29, 1938.

(By courtesy of the builders, Messrs. Vickers-Armstrong.)

tinuous service, and (2) what measures could be put into force to obtain the requisite body of seamen on mobilisation. The number of officers and men then serving in the Fleet was 45,500, of which 12,500 were Royal Marines.

The Committee reported that they had come "unanimously to the conclusion that the time has arrived for placing Her Majesty's Navy on a more permanent basis, upon a similar principle to that established in the Army and Marines. . . . We are very desirous that it should be effected wholly by voluntary service."

An Admiralty Circular dated June 14, 1858, announced the institution of continuous service. Boys were required to sign an agreement for ten years' general service from the age of 18, but they were not to be entered before 14. They could re-engage for two further periods of five years; pensions or retainers were to be paid after ten, fifteen, and twenty years' service, and pensioners were liable "to serve again . . . in the event of an armament, or war." Among other reforms were: an increase of pay, 1*d.* a day for boys; leave with pay; ratings to be entered in the port flagship on return, and the institution of the ratings of leading seaman and chief petty officer. Over 20,000 men and boys, more than one-third of the total number then serving, transferred to continuous service. So began the present-day system.

TRAINING SHIPS.

Within a year the Russian War of 1854-56 broke out and large fleets had to be sent to the Baltic and Black Sea. Numbers rose, in two years, to 60,000 seamen and 16,000 marines. The additional men were obtained by voluntary means, but practically the whole of the Preventive Coastguard force of the Customs Service had to be called out. Considerable delay occurred in completing the ships specially commissioned and large numbers of the crews were untrained landsmen, about whom many adverse reports were made.

"In 1854, during the . . . War, Sir James Graham, then First Lord of the Admiralty, conceived the plan of establishing at Portsmouth a training ship for young seamen, in order to provide a better class of men to fill the vacancies in the Fleet. They were shipped under the name of novices, and were popularly known as *Jemmy Graham's novices*. . . . The *Illustrious*, a two-decker previously used for gunnery training, was appropriated for this purpose, and Captain R. Harris was placed in command."*

He entered his son, afterwards Admiral Sir Robert H. Harris, on board as a cadet, to be trained with the novices, and so commenced not only the boys' training ship system but also, in 1856, the *Britannia* system of cadet training.

Meanwhile, the *Implacable* was in 1855 commissioned at Devonport as the second boys' training establishment. Originally the French *Duguay Trouin*, she was launched at Rochefort in 1800, and survived the Battle of Trafalgar, but was captured a fortnight later. She was merged into the *Lion* establishment at Devonport in

* "The Story of the *Britannia*," Cdr. E. P. Statham (1904).

1871 and put on the sale list in 1908, but is still afloat at Portsmouth as a holiday training ship for young people.

ROYAL COMMISSION OF 1858.

The experiences of the Russian War disturbed the equanimity of the country, and a Royal Commission was appointed in 1858 "to enquire into the best means of manning the Navy." The Commission concurred with the 1852 Committee that boys were the best recruits for continuous service and, as the number entered annually was restricted to 500 owing to lack of training accommodation, advocated among other reforms the use of separate training ships. They also recommended a new form of reserve of merchant seamen, the Royal Naval Volunteers, of 20,000 men; this was the origin of the Royal Naval Reserve.*

The Royal Commission may be said to have cemented the foundations and enlarged the edifice of the 1852 Manning Committee. For the first time manning and training were placed on a proper footing, the addition to the Navy Estimates being £600,000. Four more large ships were eventually employed as training ships: the *St. Vincent* at Portsmouth and the *Impregnable* at Devonport, both in 1862; the *Boscawen* in Southampton Water, 1863, until about 1867, when she was moved to Portland; and the *Ganges* at Falmouth in 1866. These old "wooden walls," with certain changes and additions, continued in service for half a century.

SAIL TRAINING.

In 1885, the flagships of the Channel, Mediterranean, and China Squadrons were the *Minotaur*, *Alexandra*, and *Audacious*, respectively; all steamships, but also fitted with masts and sails as full-rigged ships. Many ships had no sails and no more masted capital ships were being built, but cruising under sail and drill with masts and sails continued as ordinary activities of the Fleet. That year the Training Squadron was organised of six (later reduced to four) full-rigged second-class cruisers or corvettes.† Based at home, the squadron made prolonged cruises to Norway, Madeira, etc., almost invariably under sail alone, except in narrow waters. In addition to boys from the training ships, midshipmen were drafted to these ships. The squadron existed for 14 years and at the end of the century, except for a few sloops on foreign stations and the day-trip brigs attached to the harbour training ships, these were the last masted ships in commission.

By this time (1899) nearly forty years had elapsed since the *Warrior*, the first ironclad, a steamship, though fitted with sails, was launched (1860) and nearly thirty years since the first sailless ship, the *Devastation*, was commissioned. Yet, but for the accident

* For history of the Royal Naval Reserve, see "Brassey," 1935, Chap. XI.

† In 1888 the four vessels were *Active* (Commodore A. H. Markham), *Calypso*, *Rover*, and *Volage*, and they had commissioned in September, 1885. The *Cruiser*, a sailing sloop, had been in use in the Mediterranean as a training ship for ordinary seamen for some years.

of the Boer War, the sail Training Squadron might have survived well into this century. The Boer ultimatum was issued on October 9, 1899, and three weeks later the ships were paid off and their ships' companies of about 1,400 officers and men transferred to four modern cruisers.

It was suggested that the immediate reason for this change was the necessity of increasing the number of effective fighting cruisers in commission, but it was also asserted in the controversy which followed that the Training Squadron of masted ships had ceased to be of practical use even for the purpose for which it had been specially instituted. In fact, in the latter years only 30 per cent. of the whole seamen class had passed through it.

Sail training lingered on in masted ships for another three years and when abolished, in 1902, "a deputation from the Admiralty saw sail drill performed for the last time in one of the old masted iron-clads." * The sailing brigs attached to the harbour training ships survived for another year, and so it was not until 1903 that sail training actually ended.

In 1904 old third-class cruisers were employed in a modified way as seagoing tenders to the harbour training ships, in lieu of the brigs, but at the end of the year, when a lot of obsolete vessels were scrapped, this practice ceased.

NEW SYSTEM OF TRAINING.

Three important Admiralty memoranda on training were issued during 1902-1905, for which Admiral Sir John Fisher, as Second Sea Lord from June, 1902, to August, 1903, and First Sea Lord from October, 1904, to January, 1910, was largely responsible. At the end of 1902, Lord Selborne's famous memorandum which instituted the common-entry, or Selborne-Fisher, scheme for officers was issued as a Parliamentary paper, Cd. 1885. It also dealt briefly with the training of warrant officers, petty officers, and men.

On March 28, 1903, an Admiralty Circular gave the details of mechanical training for seamen. "Physical and mechanical training is to be largely substituted for mast and sail drill and such other drills as are not suited for the modern seaman." Ordinary seamen were to be trained at sea in the use of simple mechanical tools and in stokehold work before being considered qualified to be rated able seaman. It should be noted that, during high-speed steaming in coal ships, seamen had to augment the stokers and in ships without ash ejectors to get up and dump the ashes.

In November, 1905, at the end of the Conservative administration, Lord Cawdor issued as a Parliamentary paper, Cd. 2791, his famous "Statement of Admiralty Policy" dealing with the entry and training of officers and men, Fleet organisation, etc. In dealing with the training of seamen it stated :

"No amount of dexterity on the main royal yard would make a good gunner or torpedo man, although the physical exercise which the old sailing ships afforded was

* "Sailing Ships of War, 1800-1860," Sir Alan Moore (1926).

undoubtedly beneficial; but as physical exercise can be introduced in other more useful ways, and in a more scientific manner, it was needless to adhere to it in this form."

Boys were then recruited between 15½ and 16½ and received an eight months' course of elementary gunnery, seamanship, and mechanical work in a harbour establishment, followed by a four months' cruise in a first-class cruiser for practical experience. Rated ordinary seamen without examination at the age of 18, they were given courses and had to qualify in six subjects before being rated able seamen: seamanship, gunnery, field training, torpedo, mechanical work, and stoking.

Though not mentioned in the Cawdor Report, education began to receive more attention; an advanced class for boys was instituted to produce a higher standard of petty and warrant officer, and in 1907 an educational test for petty officer and other reforms were introduced.

THE "STONE FRIGATE" ERA.

Some few years previously the unsatisfactory conditions of the harbour ships for modern training had become a matter of concern. Depot-ships were giving place to shore establishments—Devonport barracks was commenced in 1879—and it was considered that the cost of maintaining several old hulks as separate establishments could be used more beneficially; further, that better results would be obtained from co-ordinated training ashore rather than afloat.

In September, 1905, Dartmouth College was opened for officers and Shotley barracks, near Harwich, for boys, and so began the "stone frigate" era of training. The boys' harbour training ships at Portland, Portsmouth, and Queensferry were abolished, and for the nine years preceding the War there were boys' training establishments only at Devonport and Harwich, the latter including both Shotley barracks and hulks.

SPECIAL EXPANSION MEASURES.

The system of continuous service, with two long periods of service, was satisfactory for normal expansion; but the passing of the Naval Defence Act of 1889, which provided for building 32 war vessels—including 4 battleships and 22 cruisers—in five years, raised the problem of entry and training in an acute form. The Navy Estimates that year were £13,685,400 and the number of personnel 65,400, an increase of £602,600 and 3,000 personnel on the previous year.

By 1894 the personnel had risen to 83,400, an increase of 6,700 on the previous year, and the number of boys then entered annually was 3,700. In the "Statement Explanatory of the Navy Estimates for 1894–95" the First Lord stated:

"We propose to enter 800 seamen direct from the Mercantile Marine and other sources in order to meet present wants, and to meet the objections, in case of war, of having to fall back on too large a number of our Reserves,"

but in the Statement for the following year's Estimates it was admitted that the plan was not successful and other steps were taken.

The cost of training a marine was considerably less than that of training a seaman because of the later entry. With the great advance in public education, Lord Brassey, among others, had contended several years earlier that it should be possible to enter young seamen at the same age as marines.* This was one of the steps decided on by the Admiralty.

ENTRY OF YOUTHS.

The cruiser *Northampton*, a steamship with sails, was commissioned in 1894 to receive boys at a later age and pass them into the Service after six months' training. This started the entry of youths between 16½ and 18 years, who became known as "Northampton riggers." The ship cruised to different parts of the British Isles to obtain recruits: the experiment was successful in obtaining sufficient boys to complete the complement, and two more cruisers were commissioned for the purpose, the *Curacoa* in 1896 and the *Calliope* in 1897. In 1905 the initial training of youths was for eight weeks, and they were then sent to the Training Squadron for the four months' cruise and much the same course as boys. Youths were later entered and trained on board *H.M.S. Ganges II* at Harwich until 1913, when the training was transferred to Devonport barracks.

Another method adopted to increase the numbers was re-engagement after completing time for pension, the 1900 Recruiting Pamphlet stating that continuous employment was provided "up to the age of 50, and to that of 55 in certain ranks and ratings."

That year (1900) an Act of Parliament authorised the establishment of a new Reserve force, the Royal Fleet Reserve, consisting partly of men who had left without earning a pension (Class B) and partly of men who had been pensioned (Class A), the latter eventually superseding the Seaman Pensioner Reserve. In spite of this new development the First Lord in his Statement for the 1902 Estimates remarked: "The increase of the Reserves has not kept pace with that of active service ratings," and a special committee, presided over by Sir Edward, afterwards Viscount, Grey, was appointed to consider "generally whether and how, consistently with efficiency, naval reserves can be more fully utilised to supplement the active service ratings in peace or in war?"

NON-CONTINUOUS SERVICE INTRODUCED.

The result was to depart from the half-century's principle of continuous service and to introduce in the following year non-continuous, or special, service for seamen and stokers. The age of entry was 18 to 23 and these ratings were only required to serve for five years in the Navy and a further seven years in the Royal Fleet Reserve. Thus there were now three systems of entry.

* "Brassey," 1887, p. 32.

The numbers entered in 1903 were as follows : boys (15½–16½), 3,155 ; youths (16½–18), 1,251 ; ordinary seamen (18–23), 445.

The expansion of the Navy was such that just before the War (July 15, 1914) the total active service personnel was 146,047. Ten days after hostilities commenced this number had increased to 147,667 and with 54,540 reservists mobilised gave a total of 201,017. Shortly afterwards the Royal Naval Division was formed of three brigades of naval and marine reservists, for whom there was no immediate naval need. They served with the Army throughout the War, and their places, as soon as the inevitable naval expansion called for their services afloat, had to be taken by new entries.

WAR TIME TRAINING.

From August, 1914, the expansion of numbers was rapid and progressive. There was never any real scarcity. Boys were enlisted and trained in large numbers and all the training establishments were busy. In the Powerful at Devonport, boys went through a ten-weeks' course of practical seamanship. "At Shotley the course varied from six to ten months, including twelve weeks' seamanship, with half-time school instruction, followed by ordinary gunnery (10 weeks) and, by selection, advanced gunnery (24 weeks)." * At Devonport barracks the course for ordinary seamen (youths) was six weeks and included discipline, drill, seamanship, internal organisation of ships, and duties aboard, etc. When the compulsory system came in, special arrangements were made for passing the older men rapidly through the mill.

Sir John Jellicoe, Commander-in-Chief of the Grand Fleet, stated † that at the end of 1914 :

"the problem of training personnel was . . . beginning to prove serious. In order to commission the large number of new ships . . . it became evident that it would be necessary to remove trained men from the Grand Fleet and to replace them with boys or untrained landmen. . . . The Grand Fleet became, in effect, a great school for turning out trained personnel for the Navy as a whole, while still keeping watch over the High Sea Fleet . . ."

It is also on record ‡ that

"For the first year of the War it was not possible, in sea-going ships, to give detailed attention to the education of the younger seamen. However in October, 1915, the Commander-in-Chief issued the important Grand Fleet Order (No. 192) on this subject, and published a syllabus for the instruction of boys similar to the scheme in force at Shotley."

It was then felt that a more continuous regular system was required, and in December, "partly at the request of the men themselves," § the Commander-in-Chief applied for an experienced schoolmaster to be attached to each battle and battle-cruiser squadron, to supervise the work done by the acting schoolmasters

* "Brassey," 1919, Chap. IX—"Administration and Personnel," p. 217.

† "The Grand Fleet," p. 188.

‡ "Brassey," 1919, p. 219.

§ "Brassey," 1933, Chap. V—"Naval Education," p. 83.

(ratings) * in the ships. A few months later one was appointed to each light-cruiser squadron and submarine flotilla. Finally, in June, 1916, the Admiralty appointed a certificated schoolmaster to every warship down to and including light cruisers. Eventually 240 schoolmasters, many of them graduates of British Universities, were entered for the period of hostilities only.

Examinations were re-introduced and in June, 1916, the educational test for petty officer was held. Over 2,000 men had entered for this examination, but the numbers were reduced by the casualties at the battle of Jutland and about 1,500 sat. This test was held every quarter during the remainder of the War, and on an average about 1,200 men took the examination.

In September, 1916, Sir John Jellicoe issued another order stressing the importance of the education of boys and younger seamen, and in November, when Sir David Beatty took over the Fleet command, he also issued an order on the subject. In April, 1917, the Admiralty approved of a test for the accelerated advancement of boys to men's rating at $17\frac{1}{2}$ instead of the usual age of 18, provided the boy passed a professional examination in seamanship and also a school test. This was the first school test for a rating below petty officer. Great encouragement was given to school training when the Admiralty instituted the "higher education test" in March, 1918. At first it was not a qualifying test for advancement, but it became a test in April, 1919.

POST-WAR DEVELOPMENTS.

During hostilities the personnel increased from the pre-War figure of 146,047 to 407,316, a gross expansion of 261,269, or making allowance for 63,842 reserves in 1914, a net expansion of 197,427, of whom 74,437 were for hostilities only. With the cessation of hostilities the number of entries was drastically reduced, redundant harbour training ships were disposed of, and the two boys' training establishments at Devonport merged into one, the Impregnable. At the end of 1922 recruiting was entirely suspended for some months, as the result of the Washington Disarmament Conference and the Geddes Economy Report, and in the following year was in operation only on a very restricted scale.

The normal entries of boys were resumed in 1924, and, as further accommodation was required, the battleships Colossus and King George V were temporarily attached to the Impregnable, though it was officially admitted that "such arrangements are costly." The amalgamation of the two branches of the Royal Marines, in 1923, was to provide the solution, as the R.M. barracks at Forton, Gosport, were no longer required and it was decided to adapt them for permanent shore accommodation as a boys' training establishment. This was opened as H.M.S. St. Vincent in June, 1927. Eighteen

* All qualified schoolmasters were withdrawn from sea-going ships in 1889, when the Fleet expansion began. For a quarter of a century school instruction at sea was left to "any competent person" (rating) willing to volunteer for the duty, provided that "the person has not neglected any other duty which by his rating he was bound to perform."—King's Regulations and Admiralty Instructions, 1913.

months later the Impregnable establishment was closed down, and the initial training of boys was then adequately provided for in the two shore establishments at Shotley and Forton.

The entry of a few short service seamen was re-introduced as an economy measure in April, 1926, but the periods of service were the reverse of those before the War, i.e. seven years in the Fleet and five in the Reserve. The short service system was extended to the telegraphist branch in 1932 and to the signal branch a year later.

DIRECT ENTRY INTO ADVANCED CLASS.

A new departure in recruiting was made in 1928 when the Admiralty appealed to Local Education Authorities and similar bodies, and the nautical training establishments,* for a limited number of boys who had received a good education to be entered direct in the Advanced Class. The object was to give them "an advanced education, in order to provide well-educated men for commissioned and warrant officers and for the higher ratings." †

Competitive examinations were to be conducted by the Local Authorities, but candidates in possession of a First Schools Examination Certificate were exempt from the examinations.

The scheme did not prove a success either in attracting larger numbers or in raising the standard of entrant. At the first examination in July, 1928, 118 candidates were successful, but only 63 were eventually accepted. The classes of schools from which the boys came who passed the examination were: secondary schools (nearly one-fourth), 28; junior technical schools, 20; private schools, 16; grammar schools, 10; county and central schools, 9; and the remainder, various. ‡

In a statement to the Press early in 1929 the Admiralty admitted that fewer candidates were obtained than had been expected, but decided that the scheme was to be continued. Six months later, after the second year's selections, which numbered only 58, the scheme was abolished. The reason given later in the House of Commons was that "the Royal Navy was not getting better recruits than by ordinary entry, which was the object of its institution." Actually the boys from the additional schools were in no way outstanding, in fact often the reverse.

LIMIT OF REDUCTION.

In February, 1929, all recruiting was suspended, for the first time since 1922, because the numbers borne were up to authorised establishment and because the personnel was to be reduced by 2,000 in the new Estimates. Entries were resumed, on a limited scale, from April 1, and the number under training in each of the two boys' training establishments was then about one thousand.

* Royal Hospital School, Greenwich, training ships *Arethusa*, *Exmouth*, *Indefatigable*, *Mercury*, and *Warspite*, the *Lancashire* and *National Sea Training Home* and *Watts Naval Training School*.

† Admiralty Fleet Order, No. 8, January 6, 1928.

‡ "Brassey," 1930, p. 22.

The personnel reached a minimum in 1932. Next year the tide turned and the First Lord, Sir Bolton Eyres Monsell, in his speech on the Estimates stated :

" In these Estimates we are entering the largest number of boys that our training establishments can hold ; 2,500 boys as against an average of about 1,300 in the last four years. In addition to them, we are entering 900 short service seamen as against an average of about 100 in the last four years."

The first White Paper on Defence was issued in 1935, an increase of 2,000 in the personnel was announced in the Estimates, and in February, 1936, the Supplementary Estimate, which resulted from the Italian-Abyssinian crisis, authorised a further increase of 3,500. The 1936 Estimates and the first Supplementary Estimate added another 3,672 and further increases were made in the following year.

At the end of 1935 the Admiralty decided to use the old naval detention barracks at Devonport as a third boys' training establishment and to transfer the youths, who hitherto had been trained there, to the barracks. A few months later the name Impregnable was revived for the new establishment.

The 1936 Supplementary Estimate authorised a fourth boys' shore training establishment at Rosyth but, as that would take some time to complete, and as the entry of seamen both for continuous and special service had been greatly increased, other accommodation had to be provided. The liner *Majestic*, about to be broken up, was purchased and converted into a stationary training ship for 1,500 boys and 500 apprentices. Commissioned as *H.M.S. Caledonia*, thus reviving the old Firth of Forth training ship name, in April, 1937, she was secured alongside in a basin at Rosyth dockyard, as a temporary accommodation ship until the new shore establishment is opened.

The special service system was extended to boys between 16½ and 17½ for the first time in June, 1936. At first they were trained in Chatham barracks, but in the following February the former R.N. Sub-Depot at Sheerness, closed down in 1921, was commissioned as a fifth boys' training establishment to accommodate 500 special service boys.

At the end of 1938, in a statement on naval recruiting in the House of Lords, Lord Birkenhead said that during 1937-38 over 15,000, of all branches, had joined the Navy ; though this was only a percentage of those who wished to do so, but were debarred by the high standard required. Recruiting was satisfactory, except for certain artificer and artisan branches and there was a shortage in short-service ordinary seamen.

SEA-GOING TRAINING.

Although it can be said that since the War the shore training of seamen has kept pace with the demands for accommodation and has shown a steady improvement, the same cannot be said about their sea-going training. Almost immediately after the War a sea-going

battleship was allocated for Dartmouth cadets and a cruiser for special entry cadets, and this policy continued until 1924. For nine years cadets were then sent straight to the Fleet. Sea-going training for cadets was again revived in 1933 and has continued since, at first on board the Frobisher and from 1937 the Vindictive, both cruisers being specially fitted out for the purpose.

No ships were specially allocated for the sea-going training of boys for eight years; battleships of the "Iron Duke" class were then employed for the five years 1926-1931; there was then no ship for some four years, and from 1935 till September, 1938, various battleships and latterly a cruiser were utilised.

In 1925, in consequence of the difficulty in finding accommodation afloat for boys and ordinary seamen, arrangements were made for about 500 to be accommodated at Port Edgar, Firth of Forth, where they were trained for able seamen in the old destroyer depot and in the destroyers of the reserve flotilla stationed at that port. In 1927, with the formation of a Training Squadron, it was not necessary to continue to utilise Port Edgar.

For reasons of economy, in 1926 the four ships of the "Iron Duke" class were withdrawn from the Mediterranean Fleet, being replaced by only two of the "Royal Sovereign" class, and it was decided to revive the pre-War practice of a sea-going boys' training squadron, though instead of being an independent flag officers' command it was a unit of the Atlantic Fleet.

Each ship carried some 400 boys, who generally remained on board for one cruise of four months and occasionally for two cruises. Although owing to refits and other causes all four ships were seldom in use together, this was the only period since the War when the sea-going training of young seamen was really systematic, but this state of affairs lasted for only three years. With the withdrawal in 1928 of the Iron Duke for large repairs the squadron was reduced to three ships, and in the following year it was again reduced by one ship, the Benbow, undergoing large repairs. In 1930, also for economic reasons, the remaining two ships, Emperor of India and Marlborough, were stationed at Portland, where they formed an independent command. The London Naval Treaty (1930) resulted in five capital ships being removed from the effective list in 1931, and the disappearance of three Iron Dukes caused the abolition of the Boys' Training Squadron. Boys had then to be sent from the shore establishments direct to the Fleet.

Four years later the Iron Duke was employed for the training of boys in addition to her duties as gunnery firing ship. The First Lord, Lord Monsell, in his "Statement Explanatory of the Navy Estimates, 1936," stated:

"The large influx of young ratings to the Fleet has emphasised the desirability of a training squadron for boys leaving the training establishments, so as to relieve ships belonging to the main Fleets of their undesirably heavy training duties. One ship is already used solely for this purpose and it may be necessary to add more in the near future."

The Royal Sovereign was employed from January, 1936, and in

April it was decided also to employ the Ramillies which, with the Iron Duke, for a period gave three sea-going battleships. From that time, although the ships changed, two of the "Royal Sovereign" class, carrying some 300–400 boys and ordinary seamen each, were utilised until January, 1938, when the cruiser Cornwall relieved the Royal Sovereign.

When the Fleet was mobilised, at the time of the international crisis in September, the Ramillies and Cornwall were completed to war complement, the boys and ordinary seamen under training were discharged, and the sea-going training of such ratings ceased. Boys were then sent from the shore establishments to Reserve Fleet cruisers, two at each home port, for intermediate training before being sent to the Fleet. Although a more satisfactory scheme, than that of sending boys direct to the Fleet, it has many obvious disadvantages as compared with training in special sea-going ships.

PRESENT ENTRY AND TRAINING.

At the end of 1938 there were four training establishments for long service boys, the Ganges, St. Vincent, Impregnable, and Caledonia, and one for short service boys, the Wildfire. After completing their shore training, all boys were drafted to one of the six harbour cruisers at the three home ports for intermediate training and then to the Fleet. Short service ordinary seamen were being trained in the three naval barracks and then sent direct to the Fleet. The numbers entered in 1938, up to December 7, were: boys, long service, 3,795; boys, short service, 939; and ordinary seamen, short service, 2,926; giving a total of 7,660.

The average numbers under training for 1938–9 and 1932–3, the lowest year, were:

	1938–9.	1932–3.
<i>Long service boys:</i>		
Ganges	2,100	900
Caledonia	1,500 *	—
St. Vincent	850	600
Impregnable	200	—
Totals	4,650	1,500
<i>Short service boys:</i>		
Wildfire	550	—
Total No. of seamen boys	5,200	1,500
<i>Short service ordinary seamen:</i>		
R.N. Barracks (3)	1,750	100
Total No. undergoing shore training	6,950	1,600
No. in training cruisers (6)	1,100	—
Total No. under training, outside the sea-going Fleet	8,050	1,600

* This number is being reduced to 1,000.

The systems of entry and training open to a seaman recruit are three in number :

	Age.	Period of Service.
1. Long service boys	15 to 16½	12 years from age of 18.
2. Short service boys	16½ to 17½	12 years from 18 ; in the Fleet for 7 and in the Reserve for 5 years.
3. Short service ordinary seamen	17½ to 22	12 years from 18 or date of engagement, whichever is the later ; in the Fleet for 7 and in the Reserve for 5 years.

After 12 years' continuous service men may volunteer to complete another 10 years' service for pension ; or join the Royal Fleet Reserve and draw a retainer of 3s. 6d. a week, and after 22 years' combined service in the Fleet and Reserve receive a gratuity of £75. Short service boys and ordinary seamen, who show sufficient promise and reach the necessary standard, may transfer to continuous service on or after being rated A.B. and having served for not less than two years.

Long Service Boys are entered as boys, second class, at one of the four boys' training establishments at Harwich, Gosport, Devonport, or Rosyth. The general principle governing their training is half-time school and half-time technical instruction. The object is to train them to take their places in the Fleet as boy seamen and to send them to sea with a thorough grounding in discipline, seamanship, and gunnery, upon which their further training for ordinary seaman and able seaman can proceed progressively.

Preliminary Course.—On joining, they are given a four weeks' Preliminary Course in discipline, squad drill, swimming, etc. During this course boys may volunteer to become signal boys or boy telegraphists and, if selected, are classed up in their new rating.

Ordinary Boys then undergo the General Course of seamanship, seventeen weeks ; gunnery, four weeks ; discipline and field training, two weeks ; as follows :

	Weeks.
Half-time preparatory school and half-time technical instruction . .	12
Full-time technical instruction	8
Half-time general school and half-time technical instruction	6
	<hr/> 26 <hr/>

Lectures on the object and ideals of the Navy, Naval Traditions, Elementary Naval History, etc., to develop *esprit de corps*, are given at convenient intervals, and the whole course, including work of ship-time and leave, lasts about nine months.

Advanced Class Boys.—Boys able to pass a higher standard educational test are selected for the Advanced Class from mercantile training establishment and Royal Hospital School entries on joining, and from other entries, after four, eight, or twelve weeks of the General Course. These boys do half-time school and half-time technical instruction throughout their training and, taking the same technical syllabus as ordinary boys, their whole course lasts about twelve months. This advanced course is intended to fit boys for early advancement in the Service.

Boys, First Class.—Boys, second class, who have passed the swimming test and made satisfactory progress in other instruction may, if advanced class, be rated boy, first class, after 20 weeks, and, if not

advanced class, after 27 weeks. Mercantile training establishment and Royal Hospital School boys, who omit all or part of the Preliminary Course, may be rated correspondingly earlier.

Short Service Boys are also entered as boys, second class, at the special boys' training establishment at Sheerness. The object of their training is to provide a grounding in the seamanlike knowledge required for the rating of able seaman. These boys undergo six months' training, which includes :

	Weeks.
Preliminary and New Entry Course	10
Seamanship	10
Gunnery	3
Torpedo	1
Various, inspections, etc.	2
	<hr/>
	26
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During the New Entry Course short service boys undergo four hours' school per week and are then examined educationally for A.B. (S.S.). The professional examination is carried out during the other courses. Boys (S.S.) are advanced to boys, first class, at the end of the ten weeks' New Entry Course, if qualified educationally, and are rated ordinary seamen after an average of eleven months' service. They may obtain the same accelerated promotion to A.B. as long service ordinary seamen.

All boys, continuous and non-continuous service, are drafted from their shore training establishments to one of the six harbour training cruisers at the home ports, for three months' intermediate training before being sent to the Fleet. During this period, as far as possible, they were given the three Ordinary Seamen's Training Courses for A.B., which otherwise have to be carried out in a sea-going ship.

Short Service Ordinary Seamen are entered at one of the barracks at the home ports. They are given the same six months' training and examinations as short service boys, with one week's practical training afloat in a destroyer, when possible, and then sent direct to the Fleet. Those who show outstanding ability at sea may be rated A.B. (S.S.) after 16 months' service, and others between 16 and 18 months, according to the result of their professional examination.

TRAINING IN THE FLEET.

School Training of Boys.—A new scheme of school training of boys was begun in the Home Fleet in August, 1938,* and in other ships in January, 1939. General Course boys are graded in two sections, "Upper" and "Lower," instead of G.C. 1, 2, and 3, as formerly, the dividing mark being 40 per cent. of the Preparatory and General School examinations. A new technical educational paper is to be included in the educational test. G.C.U. boys are to take a technical school course at sea of not less than 60 hours and are then to be exempt from compulsory school. Boys rated before completing the

* Admiralty Fleet Order, No. 2303/38.

course should attend as ordinary seamen. G.C.L. boys are to attend school for 12 hours a month until they have passed the A.B.'s educational test. Any boys who are unable to pass before being rated ordinary seamen are to continue preparation in their own time, and must pass the test before becoming A.B.

Early Advancement of Boys.—Long service boys outside the Training Service, and over 17 years of age, may qualify for early advancement to ordinary seaman at the age of 17½—instead of the normal 18—by passing the educational examination and the professional test for able seaman.

Training Courses for A.B.—Boys and ordinary seamen under training for A.B., at sea, undergo the following courses :

	Hours.
Seamanship	90
Gunnery	70
Torpedo	50
Total	<hr/> 210* <hr/>

Advancement to A.B.—To be rated A.B., long service ordinary seamen have to pass the educational and professional examinations and, normally, serve for 15 months as ordinary seaman, with nine months' practical experience in part of the ship. Captains may advance outstanding ratings after not less than one year's service as ordinary seamen.

FOREIGN NAVIES.

UNITED STATES.

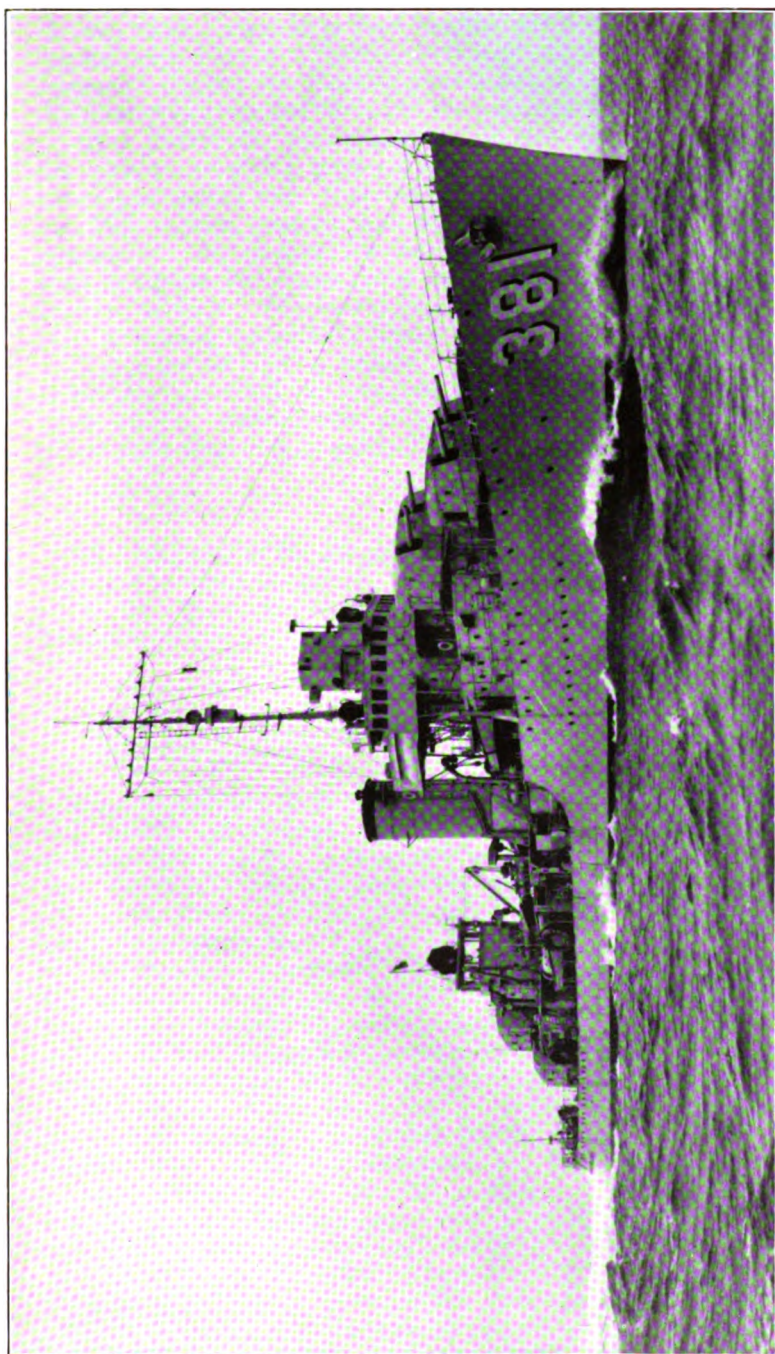
There are two classes of recruits who enlist either between 17th and 18th birthdays for a "minority cruise," being discharged on the day before their 21st birthday ; or between 18 and 25 for four or six years.

All men may re-enlist for varying periods up to 20 years' service. Pensions are payable if ratings then transfer to the Fleet Naval Reserve. In 1938 there were 172,000 applications for first enlistment, of which 16,333 were accepted, and re-enlistments averaged 72·21 per cent.

Recruits are entered as apprentice seamen and trained at one of the four Training Stations : Newport, Rhode Island ; Norfolk, Virginia ; Great Lakes (Waukegan), Illinois ; and San Diego, California. During the year 1937 there was an average of 3,670 recruits under training at the four stations. The initial course is twelve weeks and accomplishes little more than acquainting the recruit with the fundamentals of discipline and enabling him to take care of himself and his outfit.

Recruits with special aptitude are selected for specialist ratings and are given courses of elementary instruction in specialist subjects. The others are sent direct to the Fleet, where almost all the training

* As an instructional day is five hours these courses could be completed in nine weeks, but such training can be worked in only when the Fleet routine allows and usually takes much longer.



UNITED STATES DESTROYER SOMERS.
(Official U.S. Navy photograph, by courtesy of the Navy Department.)

of a seaman is carried out, and, if satisfactory, are advanced to seaman second class after four months' total service. One or two capital ships have a "Recruit Division" to which all recruits are assigned for about two months, but the general rule is for them to be distributed in twos and threes to the ordinary divisions.

Class instruction for seamen second class qualifying for seamen first class varies with the type of ship. On an average it is about 150 hours, but spread over a period of six months. It comprises seamanship, signals, gunnery, and a knowledge of the use of electrical appliances. To qualify for advancement, seaman second class must complete the course, pass the examination, and serve for six months as such. The average total length of service before being rated first class is about two years.

There are no leading seamen; further substantive promotion is to petty officer third class, second class, and first class, and to chief petty officer. Outstanding petty officers can qualify for warrant officer after seven years' service.

FRANCE.

The majority of the entrants to the French Navy are volunteers who join between 16 and 18. Conscripts, termed recruits, are called up at 20. There are four classes of entries; three of volunteers, according to their age, and one of conscripts, as follows:—

	Age.	Service. Years.
Volunteers I	16	5, after leaving training ship.
Volunteers II	17	5
Volunteers III	18	3, 4, or 5
Recruits (Conscripts)	20	2

In a recent year there were 15,065 volunteer applicants, of whom only 7,810 were accepted. About 33 per cent. were rejected at the medical examination. A large number re-engage to make the Navy their career, at least until they have acquired the right of half-pay at 15 years' service. The proportion of those re-engaged is 37 per cent. of the effectives.

The maritime conscripts, who in 1914 provided 23 per cent. of the effectives, in recent years have provided only 5.5 per cent. Each year between 3,000 and 5,000 are called up and the number who ask to do their compulsory service in the Fleet is such that only volunteers have been taken, and not all of those.

The number in the seaman branch, exclusive of boys and apprentices under training, in 1937 was 68,800, which with 3,200 native seamen (from Algeria, Tunis, Senegal and Indo-China), gave a total of 72,000 seamen below the rank of officer. Boys who enter at 16 are trained as seamen-apprentices on board the training ship *Amorique* at Brest for eight to 12 months and then spend six months in a school for specialisation. There were in one year 1,600 applications for 575 places in the *Amorique*. The 17-year and 18-year men are entered as seamen and undergo the six months' specialist course only. All three classes embark in the seagoing squadrons with the rank of brevet-seamen between 17½ and 18½. The recruits (volunteer

conscripts) are entered as seamen and embarked immediately in a squadron. A certain number of volunteers and recruits after examination are selected as provisional or permanent warrant officers. A complementary course in military technique, morale, and naval technique is later given for "brevet superieur" or higher warrant officer.

JAPAN.

Conscripts are called up at 20 for three years' service and volunteers enter between 15 and 21 for five years. Volunteer seamen first class and petty officers may re-engage for further periods of two years up to the age limit of 40.

Conscripts and volunteers are both given the title of seaman fourth class, and are trained at one of the three Training Establishments at Yokosuka, Kure, and Sasebo. Conscripts receive not more than $4\frac{1}{2}$ and volunteers not more than $5\frac{1}{2}$ months' shore instruction. The training consists of seamanship, gunnery, use of rifle, light field exercises, etc., particular stress being laid upon the "spiritual" aspect. On completion, both conscripts and volunteers are rated seaman third class and drafted to the Fleet. They receive the same general seagoing training, as to their stations and routine duties, for a period of about two months.

There is no special seagoing training for seamen second and first class. Seamen third class, according to ability and progress, are rated second class after six months afloat and, after a further twelve months, first class, which is equivalent to our leading seamen. Specialist courses are held for non-substantive ratings such as gunnery, torpedo, etc. Petty officers are selected from seamen first class, both conscripts and volunteers, and serve for a minimum of six years.

ITALY.

Conscripts are called up at 20 for 28 months' service, and volunteers enter at 16 or 17 for five years. Both classes receive the title of ordinary seaman.

All men with a seafaring connection are called up as conscripts, including sea-scouts of the Italian Youth Association who, on reaching the age of 12, have asked to remain in the maritime branch. Conscripts may be advanced to able seamen within a period of four to 18 months' service, provided they have the necessary qualifications. Promotion to leading seaman usually takes place four months after the ratings are paid off and depends on the vacancies for mobilisation and on record of service.

Selected conscripts, after 12 months' service, may transfer to the "five-year voluntary service." At the end of the conscription period, or within four months of being paid off, able seamen may ask to be retained, or re-admitted, for a yearly engagement of one year and a maximum of six re-engagements. These ratings are known as "retained conscripts" and are eligible for promotion to leading seamen after three years' total service.

Volunteers, who are paid a gratuity, undergo a theoretical and practical course of from seven to 12 months' training, according to their branch, in the naval schools. The course includes educational, military, and physical instruction, seamanship, signals, swimming, general knowledge of the Navy, and first-aid. On completion of this course, candidates of the seaman branch are sent on a five-months' training cruise on board the sailing ships Amerigo Vespucci or Cristoforo Colombo, and then drafted to the Fleet. Other ratings receive about three months' practical instruction on board a ship before joining the Fleet.

The period of voluntary service is calculated from October 1 of the year in which ratings complete their training, and on that day they are rated able seamen. On completing five years' service, volunteers may ask to remain on a two-years' engagement and, if accepted, they are promoted acting petty officers.

During the second year of this re-engagement, volunteers may apply for transfer to the permanent service. At the end of the re-engagement, ratings accepted for permanent service are promoted petty officers and are sent to the schools for a nine-months' course of professional instruction, after which they are definitely transferred to the permanent service. Petty officers admitted into the permanent service must re-engage for a further five years—giving a total of 12 years' service.

GERMANY.

Six months' labour service is obligatory before joining the German Navy. Volunteers enter between 17 and 23 for four years' service, and conscripts are called up at 20 for two years' service. Both classes receive the title *matrose* (sailor).

Conscripts of the seafaring and coastal population either serve for two years in the coastal service, afloat or ashore, or undergo six months' training ashore and then serve for 18 months in mine-sweepers and auxiliary vessels. Suitable men may volunteer for two more years.

Volunteers, who provide the bulk of the personnel, undergo about six months' training ashore in the *Schiff-Stamm-Abteilungen*. The course includes infantry drill, rifle practice, gymnastics, duties of a soldier, seamanship, and organisation of the Navy, etc. The general idea is not so much to prepare the *matrose* for duties on board ship, as to inculcate the "military fundamentals" and to foster a soldier-like spirit.

Matrosen are drafted to all types of commissioned ships where they are merged into the crew, though generally kept together in a division of their own and given special training. After one year's service and reaching a certain standard, they are advanced to *matrosen-gefreiter* (equivalent of able seaman), after two years' to *matrosen-obergefreiter* (leading seaman), and after four years' to *matrosen-hauptgefreiter* (leading seaman, higher grade).

Candidates for petty officer are selected from volunteers after two or three years' service, and they serve for a further period of

eight years, making a total of twelve. They undergo a course of twelve months' special training, six months at a Petty Officers' Training Establishment, a three-months' infantry course, and three months in a sailing ship.

After further service and more special training they are promoted to chief petty officer and later *feldwebel*. There are no warrant officers, their place having been taken by *oberfeldwebel*, who are selected and specially trained petty officers.

H. PURSEY.

CHAPTER X.

MERCHANT SEAMEN AND FISHERMEN.

THE MERCHANT NAVY IN WAR.

IN an article which appeared in last year's "Brassey" I pointed out the complete and absolute interdependence of the two Sea Services in the event of war. The Merchant Navy, I argued, was a Defence Service during hostilities, every whit as important as the Royal Navy which exists to protect it. Merchant ships were responsible for feeding and maintaining this country and for carrying on the communications over the 85,000 miles of the Empire's trade routes. During hostilities the Merchant Navy had the additional tasks of transporting troops and war material to any threatened area and of helping the Navy with large numbers of ships and men for purely naval service. Considering that the Merchant Navy was inadequate both in ships and in men to meet the strain of a possible war for which we were building up the other Defence Services, was it too much, I asked, for a Ministry of Shipping to be constituted during peace in order that the merchant fleet and its personnel might be co-ordinated into our general scheme of defence?

The lessons of the last war, when the Navy was increased by something like 200,000 men, drawn largely from the Merchant Navy and the Fishing Fleets, seem largely to have been forgotten. So does the fact that in 1917, when we had armies serving in four different theatres of war, 755 ships were required to transport and to maintain them and to supply the raw materials for the industries which manufactured their munitions and clothing. To feed and supply the home population with the necessities of life needed another 750 ships. At the same time, the Royal Navy had to be supplemented by over 100 sizeable vessels for purely fighting purposes and was fuelled and supplied by 300 more, a grand total of 1,905 merchant vessels that had to be kept manned and running. Over and above the larger vessels, a swarm of nearly 4,000 small craft—trawlers, drifters, yachts, motor craft, and the like—were absorbed into the Navy for fighting purposes.

The late Sir Julian Corbett, in "Naval Operations," Vol. I, emphasises this point. After describing the steps that had been taken before the War to organise a trawler minesweeping service and a motor-boat reserve, he continues :

"After the outbreak of war the system developed so rapidly that soon the auxiliary vessels far outnumbered those on the Navy List. The armed merchant cruisers rapidly multiplied; trawlers, drifters, and yachts were taken up in scores for minesweeping and anti-submarine patrols, and steam-craft of all kinds for the

Examination Service which controlled the flow of trade in our Home Waters. There had been nothing like it since the distant days when the Mercantile Marine was counted as part of the Navy of England—nothing to equal it even in the heyday of privateering or in the days of our floating defence against Napoleon's Invasion Flotilla. Faced with a struggle the gravity of which was to be quickly recognised, the country not only fell back to the mediæval spirit in which its sea power had been born, but infused into it a new and wholly modern energy and method. The whole seafaring population, in so far as it was not needed for other work vital to the national life, gathered to the struggle before it was six months old. . . . Such a reawakening of the old maritime spirit which had lain dormant for so many ages must always remain as one of the most absorbing features of the War, and the strangeness of the revival is all the more impressive when we remember that it was mainly the mine and the submarine, the very last words of the Naval Art, that threw us back to the methods of the Middle Ages." *

The passage quoted is worthy to be remembered ; and to the mine and the submarine must now be added the aeroplane. Moreover, it is woefully apparent that the Merchant Navy of to-day, numerically, is by no means adequate for or capable of the same national effort as it was in 1914.

IS THE MERCHANT NAVY ADEQUATE ?

In the King's Speech at the opening of Parliament in the autumn of 1936 it was stated that the Government was considering what measures were necessary " to secure the maintenance of a mercantile marine adequate for the needs of the country." To this end the Admiralty has done its share by inaugurating defence courses for Merchant Navy officers. Steps have been taken here and there to provide better accommodation and amenities for merchant seamen, and hours of work have been regulated. A training scheme of a sort has been started for young officers and an officers' contributory pension scheme, long overdue, brought into being.

But all this has been mere nibbling at a problem which is as complicated as it is important. Little or nothing seems to have been done to implement the King's Speech. For the past year and more there have been many speeches and statements on the part of those in a position to know on the subject of the woeful condition of the Merchant Navy. There have been articles and much correspondence in the Press, and on July 8, 1938, a full-dress debate on the subject in the House of Commons. To quote *The Times* of July 9, this debate " was remarkable for the unanimity of a demand for some vigorous action by the Government to maintain the strength and prestige of our merchant fleet in the face of subsidised ships of other nations." The decline in ships and in seamen was clearly pointed out, and there was some sharp, and perfectly justifiable, criticism on the standards of accommodation in certain British ships as compared with those of other countries.

In his reply, the President of the Board of Trade observed that a good deal of criticism had been directed against a statement by the Minister for the Co-ordination of Defence to the effect that a general review of British shipping showed that its position in an

* " The Official History of the Great War. Naval Operations." Vol. I. New Edition. By the late Sir Julian Corbett. P. 17. Longmans, Green, & Co., Ltd. Quoted by permission of the Controller, H.M. Stationery Office, and of the Publishers.

emergency would not be unsatisfactory. It was quite impossible, he said, to judge the correctness of that statement simply by comparing the amount of tonnage under the British flag to-day with what we possessed in 1914. Any real consideration of the adequacy of the Merchant Navy for an emergency depended upon a vast number of considerations, many of which could not even be discussed in public. He went on to say that we had to assume who were going to be our enemies, what kind of war we were likely to have to fight, whether it was likely to be spread over a number of different theatres, as in the last war, and the new speed of modern methods of loading and unloading. Against that had to be estimated the effects of the new and increased peril of the air, and what was believed to be the decreased peril of the submarine. Only after taking all these factors into consideration could they venture an opinion. It was on those considerations and those assumptions that the Minister for the Co-ordination of Defence had made his statement. While he, the President of the Board of Trade, did not believe that it was either wise or necessary to paint things blacker than they really were, he did not want the House to think that the phrase "not unsatisfactory" applied to our Merchant Navy filled him with complacency or made him think that there was nothing left to do. Even if the Service was sufficient for an emergency should it come, we wanted more than sufficiency—a good margin of security as well. (Cheers.)

In September, 1938, some eleven weeks after that debate, we were nearly at war. In the light of the possible combination of Powers that might then have been ranged against us, Powers whose policy and ideology have been known for years, it cannot be said that the Merchant Navy was in any way adequate to the onerous task that might have confronted it.

What of the large number of submarines possessed by these Powers and their wide range of action? Why do they exist? Are we prepared to pin our faith to peace-time enactments which lay down rules for the "humanisation" of submarine warfare—e.g. that merchant vessels may not be sunk or rendered incapable of navigation unless and until passengers, crew, and ships' papers have first been placed in a place of safety? Moreover, however gentlemanly may be the submarines, there is no similar legislation to make unlawful the wholesale bombing of merchant ships by aircraft.

No. What was far more likely was that if war had come in September we should have had to adopt counter-measures in the form of a convoy system that, eventually, would have had to be practically world-wide to be effective. The need for merchant ships and seamen would have increased, for a convoy system entails delay in the arrival of cargoes through the speed of the convoy being the speed of the slowest ship. We should also have required many more armed vessels for convoy protection, which must have been largely manned by personnel drawn from the Merchant Navy. Is it therefore unfair or unwise to judge the adequacy of the Merchant Navy by comparing the tonnage under the British flag to-day with what we possessed in 1914?

When the President of the Board of Trade made his reply in the House of Commons on July 8, 1938, can he have been aware that, as will presently be shown, we now possess 3,500,000 less tons of cargo-carrying ships than we had in 1914, and that in the same period the number of our merchant seamen has fallen by 20 per cent.? The answer, one imagines, is in the negative. Otherwise Mr. Stanley could not have supported Sir Thomas Inskip's statement that the position of the Merchant Navy was "not unsatisfactory."

There has been too much lip-service and complacency—too much placing of responsibility upon shipowners, who must run their ships at a profit if they are to run at all. In most cases they cannot hope to compete with the heavy Government subsidies enjoyed by the ships of foreign Powers.

There is no denying that the Merchant Navy is a Defence Service in war, and in view of our rearmament in other directions it cannot be unwise to consider it from this aspect. But by this time it seems to be clear that little will be done to prepare this essential Service for its war function unless and until there is a Ministry of Shipping with its own responsible Parliamentary head. We may arm merchant ships and train officers in the employment of their weapons; but all this is useless if we have insufficient ships and seamen to carry on the vital sea services of the country and the Empire.

DECLINE IN SHIPS, SHIPBUILDING, AND SEAMEN.

As most people are aware, the bulk of our essential cargoes is carried in simple freighters, whose work continues largely out of sight and out of mind. Some of them are large cargo-liners, running more or less regularly on certain definite routes; others tramp steamers plying wherever cargoes offer, and manned by anything between twenty-five and thirty-five men apiece. Roughly 70 per cent. of the mercantile tonnage owned in Britain and the Empire is made up in ships of less than 4,000 tons.

The number of our ships is steadily declining. In 1901 we owned 50·2 per cent. of the world's steam and motor tonnage; in 1914, 41·6 per cent.; in 1938, 26·4 per cent. Translated into other figures, our ships have diminished by about 2,000 vessels of 1,500,000 tons gross since 1914. As our tanker tonnage has *increased* during the same period from 500,000 to 2,500,000 tons, it means that we are weaker in ships to carry food and raw materials to the extent of about 3,500,000 tons.* Our War losses in shipping amounted to the prodigious total of 7,760,000 tons, and since 1914 our population has risen by 4½ millions. These facts are sufficiently disturbing.

The personnel of the Merchant Navy, excluding natives, has fallen by 20 per cent. since 1914. Between 1911 and 1936, indeed, there was a decrease of 59,000 seamen. However, even if we possessed the additional 2,000 ships, we have, as writes Sir Archibald Hurd in a letter published in *The Times* of November 1, 1938, "neither the trained officers or men to man them, so tragically has

* 1914, 17,500,000 tons gross; 1938, 14,000,000 tons gross.

the supply of recruits been falling off owing to the neglect of successive Governments to take any measures to attract men to the sea, though this country's and the Empire's highways of trade are the seas and oceans of the world." The number of men in the merchant shipbuilding trade has also fallen by 25 per cent. during the last quarter of a century, and still tends to decline.

Whereas eighty-eight ocean-going vessels of nearly 600,000 tons were launched between January and September, 1938, only twenty-two such vessels of a total of 150,000 tons were ordered. On September 30 last the total of 885,000 tons of merchant shipbuilding in hand in Britain was less by 151,000 tons than the volume in hand at the end of June, and less by 299,000 tons than the volume in hand a year before. On September 30 last, too, no less than 1,827,000 tons of shipping for British owners was being constructed abroad. There is nothing very surprising about this large decrease. To quote *The Times* of October 12, 1938 :

"Depression in the freight markets, due largely to crop failures in Argentina, the rise in shipbuilding costs, and the ability of foreign yards by one means or another to secure contracts that would otherwise have been secured by British firms, all have had their part in the diminution of work in the United Kingdom. . . . When owners of ordinary cargo vessels cannot find remunerative employment for all their ships, it must need a great act of faith on their part to contract for tonnage at prices which have risen in consequence of rearmament. Only a marked advance in rates of freight and indications of a spreading demand for tonnage would encourage them to order ships on the present terms. . . . Even with naval work allowed for, half the berths in the country, which have been reduced in number by rationalisation during recent years, are empty and must remain so until an expansion of overseas commerce justifies a resumption of mercantile building or *unless, in the national interest, it is held that use should be made of resources now lying dormant.* . . ."

The italics are mine.

It would be a calamity if these idle shipyards were allowed to languish and to die through inanition ; yet that result seems probable unless something is done to rescue them. Several measures suggest themselves. The Royal Navy required many convoy vessels during the Great War, and lacks a sufficient number now. Among other vessels, no less than 120 sloops, 32 paddle-minesweepers, and 87 twin-screw minesweepers were built in mercantile yards between 1914 and 1918. Again, it might not be impossible to build a reserve of cargo tonnage to meet our present deficiency.

However, to revert to the Merchant Navy, British shipping is struggling to maintain itself against the heavily subsidised shipping under foreign flags. Eighty per cent. of the Indian-Far Eastern trade is in the hands of the Japanese, while the British liner trade in the Pacific is rapidly becoming extinct. On many trade routes British shipping has declined or disappeared as foreign subsidies or restrictions have increased. All these facts, though outside the real scope of this article, are sufficiently alarming. Moreover, each and every one of them has its effect in reducing the number of our merchant seamen, which, as has already been pointed out, has fallen by 20 per cent. since 1914, and by 59,000 in the twenty-five years between 1911 and 1936. Even with the smaller number of ships now running and unemployment ashore, there is frequent

difficulty in obtaining crews. "One talks glibly about the nation being sea-minded," writes a shipowner in *The Times* of March 12, 1938, "but I am beginning to wonder whether the love of the sea has not dwindled to being the exception rather than the rule. How," he goes on to ask, "is the ambition to go to sea to be reborn among the present and rising generation?"

RECENT RECOMMENDATIONS.

Since the bulk of this article was written, further facts and figures have come to light which emphasise the present condition of the Merchant Navy. Speaking in the House of Lords on December 12, Lord Lloyd stated he was authoritatively, though privately, informed that when the naval mobilisation came in September, the Shipping Federation was compelled to approach the Registrar-General to curtail the calling up of R.N.R. officers and men for naval service. Instead of 10,000 men estimated to be available only hundreds could be called. Lord Lloyd had previously said in the same speech that on September 30 the Shipping Federation issued a memorandum showing that recent experience had proved that if all British merchant ships were in commission, there would be a shortage of personnel, and an acute shortage of engineer officers.

A "Fact Finding Committee" of the Chamber of Shipping, presided over by Lord Essendon, was set up by the Government in July last to enquire into the condition of the Merchant Navy. Its report was submitted to another Committee, of which Lord Essendon was also chairman, for recommendations to be made on those facts. Those recommendations were made public on January 10. They cannot here be quoted in detail; but in general terms the Committee suggested a subsidy of £2,500,000 per annum for a minimum of five years for the deep sea tramp industry; a "liner defence fund" of £5,000,000 a year for five years, for deep sea and near trades liners to be administered by the Treasury with special regard to lines threatened by foreign competition; £500,000 a year for five years for smaller ships in the near continental trades; and the same amount for coasting tramps. A further subsidy, it was added, might be necessary for coasting liners, while other financial incentives might be required if the British tanker fleet was to compete with the Scandinavian. The Committee also suggested the rectification of trade agreements which placed British shipping at an unfair disadvantage with foreign shipping, and stated the willingness of British shipowners to co-operate with the Government in providing a reserve tonnage for use in emergency, as well as in an immediate consideration of the vital and urgent problem of ship-building.

The report of the Fact Finding Committee appointed by the Chamber of Shipping to investigate the position of deep sea tramp tonnage was also made public early in January. It points out that Great Britain owns less tramp tonnage than before the War, while foreign countries own more. In particular, Russia, Japan,



55-FOOT MOTOR TORPEDO BOAT AT SPEED.

This boat, built for a foreign Government, has attained a speed of over 49 knots, fully loaded.

(By courtesy of the builders, Messrs. John I. Thornycroft & Co.)

Italy, Germany and Norway have been flooding the market with tonnage. World tonnage as a whole increased by nearly 3,000,000 tons gross between July, 1935, and July, 1938, while United Kingdom tonnage, as a whole, only increased by under 400,000 tons gross. United Kingdom tramp tonnage declined by more than 100,000 tons during the same period, while in the five years ending in October, 1938, it declined by 145 vessels of over 500,000 tons gross.

Among the advantages enjoyed by foreign competition, the report added, were ships more cheaply built, built with State aid, or bought second-hand at very low prices; lower running costs in wages, manning and, in some cases, accommodation; together with foreign Government subsidies, and indirect aids, preferences and action tending to divert cargoes into ships flying the national flag. At the same time British shipowners were handicapped by the much greater increase in building, repairs and running costs in the United Kingdom than abroad, due largely to the rearmament programme. Increases in costs in other directions during the last two years were 30 to 35 per cent. for repairs; 25 to 30 per cent. for coal; 35 per cent. for fuel oil; 20 per cent. for Diesel oil; about 10 per cent. for stores; and 20 per cent. for wages.

CONDITIONS OF EMPLOYMENT AFLOAT.

Though the Merchant Navy is called a "service," a service which we all know to be essential to the country, merchant seamen and firemen have no status comparable with that of naval ratings, soldiers, airmen, policemen, or any Government or municipal employees. By the present archaic and wholly unsatisfactory system, all officers and men of a merchant ship except the master are hired, so to speak, by the voyage, like casual labourers, and may legally be put ashore at the end of it without a hope of further employment. That most of the liner and cargo-liner companies have their more or less permanent personnel is no palliative. The fact remains that in the tramps, which constitute the major portion of our mercantile tonnage, the employment is not permanent.

Why should it be necessary to dispense with the crew at the end of each voyage? The answer, perfectly simple, is that the profitable employment of the usual run of cargo ships is not assured, and that shipowners cannot afford to pay for the crews of vessels that are laid up and idle. The industry cannot offer the same permanency of employment that obtains in other walks of life, which means that the Merchant Navy, taken as a whole, does not offer a real career to its seamen and firemen. But the shipping industry, with all its ramifications, must, in the long run, be behind any scheme of defence. It is a vital element in the sea power which forms the basic strength of the British Empire.

A steadily diminishing Service which spells unemployment to many who serve in it acts as a discouragement to new entries. Young men are unwilling to risk their careers in an industry which seems to them moribund. Except in a few isolated cases it is

neither the wages paid nor the hours worked that make the sea unattractive. Bad living quarters and indifferent food in certain ships may act as a deterrent. In the main, however, the Service is unpopular to youngsters of the best type because its seamen and firemen have no definite status and are liable at any moment to find themselves unemployed. What can be done to make the Merchant Navy a "safe" profession and a calling worthy of the name?

An adequate supply of trained seamen being a national need during war, it is not altogether unreasonable to expect the Government to help the industry by providing in some way for seamen who are unemployed. In any case, the men are entitled to draw unemployment pay from the State. Would it not be better, it is sometimes asked, if such moneys, supplemented as necessary, were directed towards the creation of a bigger and a better personnel? Other people advocate the nationalisation or partial nationalisation of all Merchant Navy personnel. Admiral Sir William Goodenough, in a letter published in *The Times* on March 10, 1938, suggests the institution "of great colleges or places where officers of all branches and men of all ratings should receive their initial training." There are many such institutions in existence, he adds, though the percentage of men who go to sea from them is very small. "Such places of initial training would give all a background," Sir William continues. "That is what is required. Self-respect will increase with such background. Better conditions will be insisted on. The whole status will rise and the Merchant Navy will take its place, as it should, foremost in the ranks of the industries of the country. I am not speaking for the moment of the great passenger liners. I am thinking more of the great cargo and commerce-carrying fleet."

Whether or not this solution is the right one I cannot pretend to say, nor am I aware who is to pay for those colleges or institutions. The fact remains, however, that men *must* be encouraged to go to sea if the Merchant Navy is to take its proper place in our essential scheme of defence. Preliminary training, improved status, decent living conditions, safe employment, and a proper scheme of pensions by right instead of by favour are all vitally important. In the letter already quoted, Admiral Sir William Goodenough also says: "Now is the time for a searching and fearless inquiry into all the conditions appertaining to the Mercantile Marine." Knowing the conditions and the general opinion of the Merchant Navy itself, the time for that searching and fearless inquiry is long overdue. The need for it is truly national. The inquiry should be one of the first major tasks to be carried out by the Ministry of Shipping which is so vitally essential to the welfare of the Merchant Navy.

ACCOMMODATION FOR CREWS.

As regards the living quarters provided for seamen and firemen on board British merchant ships, it is impossible to generalise. Certain people, even passengers, will complain about anything on board a ship. Books written by men who have signed on for a voyage or two tell of the horrors of the stewards' glory-hole in some

of the largest and most modern liners, and how the stewards are forced to make their meals off the passengers' scraps, eaten standing up in the pantries. Some of these tales are exaggerated for the mere sake of making a story. It is the fact that where stewards' mess-rooms are provided the stewards often prefer not to use them, but to eat in the quicker, old-fashioned way. However, I have seen the crews' accommodation in almost every kind of ship—liners, cargo-liners, tramps, and coasting steamers. In a few cases it has been clean, light, and airy ; but in the great majority bare, dark, and comfortless, in distinct and dismal contrast with the seamen's or stokers' mess-decks on board the smallest vessel of war.

The worst accommodation has been very bad indeed. A few weeks ago I visited a small coasting steamer at Swansea, and shall never forget the small, dark, triangular den under the forecandle which provided the living quarters for two men. The centre bulk-head was of dark-painted matchboarding, the ship's side of rusty bare steel that had once been painted. The deck overhead leaked and so did the two small portholes ; so did the pipe of the bogie stove, filled with ashes, which occupied most of the available floor space and could rarely be used at sea. A meal had recently been cooked on this stove in a frying-pan. I was told it was easier that way than having to go aft for one's grub to the galley. There were no seats or tables, food apparently being eaten standing or sitting on the lower bunk with a plate on one's knees. The bunks and blankets were filthy. There was no accommodation for clothing and oilskins, which were hung anywhere. The only daylight came in through the open door and the two dingy portholes. The artificial lighting was provided by an inadequate swinging oil-lamp with a broken glass. Washing arrangements there were none. The only sanitary convenience was a simple, unsavoury-looking trough outside at the break of the forecandle. At sea in bad weather that filthy hole must have been uninhabitable. In harbour I would not have condemned my dog to live in it. She was an old ship, of course, but is age any real excuse for enforced squalor ?

There are good ships and bad ones : shipowners who go all out for their crews' welfare and comfort, and others who grudge every penny spent upon the simplest amenities of life for their personnel. In the second of two striking articles published in *The Times* on March 7 and 8, 1938, the Labour Correspondent of that newspaper wrote : " Britain does not lead and is not attempting to take the lead of other seafaring nations in the accommodation of ships' crews."

Statistics compiled by twenty-three Port Health Authorities in England and Wales during 1937 show that of 75,675 vessels inspected, 10,857 failed to pass sanitary inspection. More than half of these failures were due to dirty and verminous conditions in living quarters and the remainder to structural defects affecting the health of the crew, though not necessarily imperilling the safety of the ship. These defects included insufficient ventilating and lighting ; defective ventilators, skylights or deck-lights, steam heaters or stoves, sanitary conveniences, side ports, bulkheads, floors, doors, bunks or bed-

steads, food-lockers, bathrooms, wash-houses, and fresh-water tanks ; foul bilges and accumulations.

It is true that not all the sanitary defects were found in British vessels ; but of these it is usual to find a quarter or more with structural defects affecting the health of the crew, and a quarter to one-third with dirty and verminous conditions. At many ports, unfortunately, dirty and verminous conditions are found to a greater extent in British than in foreign vessels.

During 1937 a number of new British vessels were inspected by Port Health Authorities in England and Wales, and it was satisfactory to note that in many of these much thought had been directed to improvements in the crews' accommodation. Central heating had been provided in berths, mess-rooms, drying-rooms, and wash-houses. There was improved ventilation and lighting, and separate mess-rooms, food-lockers, clothes-lockers, wash-houses, and water-closets of the pedestal type had all been provided. This brings these new British vessels up to much the same standard as the greater number of American, Scandinavian, German, Dutch, and certain Russian ships.

I read of an American vessel with two-berth cabins for all the men, spring mattresses, reading lights, washstands, with hot and cold running water, forced draught ventilation, hot air for cold weather and cold air for hot, and harmonious colour-schemes for walls, floors, furnishings, and curtains. This ship, a large one, had even a large recreation room for the crew, with upholstered seats, card tables, reading and writing tables, and a wireless set. A Russian ship three years old, of about 3,000 tons gross, also had two-berth cabins for the crew, with iron beds with spring mattresses and steam heaters. There were polished wooden clothes-lockers in each cabin, other wooden lockers in an alleyway outside for oilskins and working clothes. There was a wash-house with basins, showers, and a constant supply of running hot and cold water, a mess-room and recreation room with a good library.

There is much leeway to be made up in the crews' accommodation in the older types of British vessels. The chief weakness of the Board of Trade 1937 Instructions on the subject is that they apply only to *new* vessels, and there is no obligation upon ship-owners to recondition old ones. If, however, structural alterations are carried out to old ships, the plans must be submitted to the Board of Trade, whose officials will then think of the interests of the crew. In practice, however, reconditioning is rarely carried out. The process is necessarily costly, and the money is naturally grudged on improving ships to run in competition with, for instance, the Greeks, who buy up the oldest British vessels and run them in conditions of squalor infinitely worse than the worst of ours.

As to dirt and vermin, as distinct from structural defects, there is room for improvement both in new and in old vessels. This improvement depends upon human factors. The new hours agreement gives the men much more leisure, in which they ought to be able to find time to keep their quarters clean and habitable. There is also a clause in the articles of agreement to the effect that the crew collectively may be fined five shillings a day for every day the

quarters have been left dirty and verminous. This clause is seldom enforced except by the keenest owners. These owners go down to the docks and meet their vessels on arrival, which acts as an encouragement to officers and men to keep the ships up to the mark. Others delegate the inspection to others, with the result that uncleanness still flourishes.

If the wholesale reconstruction and rearrangement of older vessels to bring them up to modern standards of habitability is out of the question, at least the crews' quarters should be kept clean and decent under the supervision of the officers. Young men of to-day will not go to sea if they are forced to live in unnecessary dirt and discomfort. Many lads from mercantile training establishments leave the sea after one or two voyages because they are disgusted with the conditions. The Army had to be popularised by the belated provision of decent and up-to-date living accommodation and amenities. Why not the Merchant Navy? If the ordinary décencies of life are provided, the status of merchant seamen will improve and boys will be encouraged to go to sea. A great deal still remains to be done in this direction, though a fatherly Board of Trade lays down the scale of food rations, inspects the food, and insists upon a certificated cook being carried in all foreign-going ships of over 1,000 tons!

THE FISHING FLEETS.

Owing to the method in which the statistics are compiled, it is impossible to give the precise number of fishermen who served in the Navy during the Great War. All that can be said with certainty is that the strength of the Royal Naval Reserve (Trawler Section) increased from 3,000-odd in August, 1914, to about 37,000 at the time of the Armistice. But many more fishermen joined the Navy proper "for hostilities only," or the R.N.R. Similarly, I cannot work out the total number of trawlers and drifters used for War purposes. Judging from the Navy List for November, 1918, however, I should put the figure at between 3,200 and 3,500. Their losses during the War, while employed upon naval service, amounted to 264 trawlers and 130 drifters.

In the "Statistical Abstract for the United Kingdom" of 1938 (Cmd. 5627), from which I have taken all the figures set forth in this paragraph and the next, the total number of steam fishing craft in the United Kingdom in 1913 is given as 4,269 and the number for 1936 as 9,261. The figures for "first-class" boats, that is all steam and motor boats of 15 tons gross and upwards, have remained constant at round about 3,500. "Second-class" boats, steam and motor boats of less than 15 tons, increased from 722 in 1913 to 5,707 in 1936.

The estimated number of fishermen in the United Kingdom in 1913 was 98,900 (75,544 regular and 23,356 occasional), and in 1936, 54,419 (48,525 regular and 5,894 occasional). In short, there was a total diminution of 44,381 fishermen (27,019 regular and 17,362 occasional), which is sufficiently serious when we come to

consider the Fishing Fleet as a source of man-power during war. Added to the diminution of 59,000 merchant seamen between 1911 and 1936, it means we have 100,000 seafarers less in the country than before the War, which is very serious indeed.

Modern steam trawlers of the type that now operate from Hull on the fishing grounds off the Faroes, Iceland, and Norway, beyond the Arctic Circle to Bear Island, and to the Murman Coast, the White Sea, and occasionally to Newfoundland and the Davis Strait, cost round about £25,000 apiece. A ship of this sort called the *St. Goran*, which I boarded for her final steam trials in October, 1936, took barely fourteen weeks to build. With a length of 172 feet and a beam of 29, she was a fine, weatherly-looking vessel with a pronounced sheer, an upstanding bow with considerable flare to breast off the heavy seas, and a cruiser stern. She had a gross tonnage of 564, approximating to a fully laden displacement of about 1,200 tons. Driven by a single screw and ordinary reciprocating engines of 1,000 h.p., she had a speed of about 12 knots and, with her 400 tons of coal, could keep the sea for about twenty-five days.

Hull trawler owners alone built over forty new ships during 1935-36, and have built more since. The point I wish to make is that fishing in any case would be impossible in distant waters during war in the North Sea, and that every suitable steam trawler would be required for naval purposes.

White or demersal fish like cod, haddock, plaice, hake, etc., has become one of the staple foods of the country, about 760,120 tons to the value of about £13,300,000 having been landed in the United Kingdom in 1936.* About 30 per cent. of this white fish is sold through fishmongers' shops; 50 per cent. through fried-fish shops; while the remaining 20 per cent. is distributed by hawkers, bought direct by hotels, restaurants, or public institutions, or goes to the curers or smokers.

The trawling industry depends upon a home consumption; but the fish it supplies is liable to be cut off during war. What is going to replace it? Is it possible that herrings, which can be caught within short distances of the British coast practically all the year round, will return to favour? In spite of their high nutritive value, these fish have lost much of their old popularity. In the period 1937-38, for instance, only a third of the total catch was consumed at home, some fresh, the greater proportion kippered, and a further quantity treated in other ways. The British public disposed of some 300,000,000 kippers during the year. The total landings during the year were equivalent to about forty medium-sized herrings per head of the population of 50,000,000, though two-thirds of the quantity caught eventually went abroad.†

* Figures from "Statistical Abstract" for 1938, after deducting herrings, pilchards, sprats, and shell-fish.

† The comparative figures are interesting. In 1913 there were landed in the United Kingdom 609,168 tons of herrings, valued at £4,572,294. In 1936 the quantity landed was 279,224 tons, valued at £2,418,132. In 1913 the average annual estimated consumption of herrings per head of the home population was 14 lb., or, taking the average of the three years ending in 1913, 12·8 lb. The average of the three years 1927-29 was 8·3 lb.

A generation ago the inland population in the poorer districts, especially in Scotland, depended largely on herrings for its fish supply. The barrel of salted herrings was a conspicuous feature of the smaller provision shops. This has gradually disappeared, as have also the fish-hawkers who used to distribute fresh herrings and kippers all over the country. Increased transport facilities, mainly in the form of bus services, have made the competition of white fish more effective and widespread. White fish is easier to eat, being provided filleted. The herring is bony, and is considered unsuitable for children. It is also rather unfortunate in its capacity for self-advertisement during cooking. Again, herring cannot be used in fried-fish shops, the explanation being given that they are dark in colour, and that people will not believe they are fresh. About two-thirds of our yearly herring catch goes abroad—pickled in salt, dried by what is called the "Mediterranean cure," or "marinated" in vinegar.

The Herring Board considers that 300 steam drifters and 500 motor-boats would be reasonably adequate to provide for present-day requirements, though as there are 700–800 drifters in existence, our herring landings could be substantially enhanced. The increase might be necessary in time of war to make up for the shortage of white fish and other food, from which it appears important to keep our full drifter tonnage in being—a point on which war-time policy conflicts with peace conditions.

Our herring fishery is in a bad way, and the numbers of vessels and men employed in the industry tend to decline from year to year. The main difficulty that the industry has to face is the excessive catching power of the fleet in the face of a heavy and increasing contraction in the export market. The East Anglian herring fishery is in progress as I write this, and I read in the newspapers of 12,000,000 herrings being landed in one day and the supply greatly exceeding the demand. Drifters are having to remain in harbour because of the glut, and many of the fishermen will fail to make enough to give them £1 a week, spread over the year.

An increased home demand would help to place the industry on its feet again. I mentioned this some years ago in one of a series of four broadcast talks on our fisheries, to be bombarded with letters to say that in many towns and villages fresh herrings were absolutely unprocurable. In a sense, herring compete with the more easily cooked and eaten white fish and are rather strong for British palates. Nevertheless, better transport facilities, publicity, better methods of preservation and canning might encourage a home demand for the herring which is essential if our drifter fleet is to pay its way.

It is vital that the number of our fishermen should not be allowed to decline, for, as had been said before, these men not only provide an important reserve for naval service in the event of war, but are food producers as well. Fisheries come under the ægis of a Ministry of Agriculture and Fisheries, though what logical connection there may be between agriculture and fisheries, except that both provide food, it is difficult to understand. The Fishing Fleets and the men

who man them are every whit as essential to our scheme of national defence as is the Merchant Navy, and it is not illogical to suggest that they also should be under the jurisdiction of a Ministry of Shipping.

A MINISTRY OF SHIPPING.

If a Ministry of Shipping was found to be necessary during the Great War, it is equally essential now when all our Defence Services are being prepared for possible hostilities on a scale even wider than those of 1914-18. Headed by a Minister of Cabinet rank, it would be responsible for all the ships and the seamen of the country apart from those of the Royal Navy and the immediate naval reserves. Formed in the first instance from the Transport and Mercantile Marine Departments of the Board of Trade and the Fisheries Department of the Board of Agriculture and Fisheries, it would continue the work of both of these bodies. Reinforced as necessary and working in close co-operation with the Admiralty, other Government departments, the Chamber of Shipping and the Shipping Federation, and other shipping organisations, the Ministry of Shipping's main function would be to co-ordinate the ships and the seamen of the nation into our general scheme of defence.

I can suggest many matters of maritime importance, among them :

(1) A thorough investigation into the manning of the Merchant Navy, with suggestions for improving the status and prospects of merchant seamen and thereby encouraging youths to go to sea.

(2) The entry and training of Merchant Navy personnel.

(3) An investigation into the numerical adequacy or inadequacy of our merchant fleet and seamen for a war that can now be envisaged with tolerable clarity.

(4) An investigation into the present state of our trawler and drifter fleets, their function in war, with suggestions to prevent further diminution in our fishing vessels and fishermen.

(5) The compilation of a National Register of merchant seamen and fishermen, active and retired, that would be available in war. The preparation of instructions for each suitable individual acquainting him of his "war station," when and where he should join, etc., on the lines of the work now done on mobilisation by the Drafting Officers at Portsmouth, Chatham, and Devonport and the Registrars, R.N.R., at the mercantile ports.

There are thousands of ex-officers, seamen, and fishermen in the country anxious and willing to serve in the event of war. Instead of a stampede on mobilisation, with nobody knowing what to do, where to go, or how to get into touch with the proper authorities, it would be far more efficient if the whole process were organised beforehand and kept up to date. Unsuitable applicants for sea service would have been informed beforehand, and could join A.R.P. detachments, auxiliary fire brigades, and the like. Suitable applicants would be informed they would be called up individually as required.

(6) Useful employment for mercantile shipyards that are now idle.

(7) Such matters as the control of petroleum supplies from abroad, subsidies, trade agreements, in so far as they affect shipping, restrictions on foreign shipping, the arming of merchant vessels, convoys, the allocation of ships to particular trades or functions during war, and the various other questions dealt with by the Committees which have been sitting under the chairmanship of Lord Essendon.

For all our dislike of regimentation, Britain is still the premier maritime Power of the world, and has the most to lose if her sea communications are broken or seriously threatened. That threat may come at any time, particularly with the number of submarines that may be used against our trade. A true understanding of the present situation seems to be lacking, added to which our Parliamentary legislation is dilatory compared with the abrupt and authoritative decrees enforced by the heads of totalitarian States. In the Great War the seamen of the Royal and Merchant Navies and of the Fishing Fleet met and mastered the greatest peril that has ever beset the British Empire. Their courage still exists. Are we to fail through procrastination, lack of forethought and preparedness?

TAPRELL DORLING.
("Taffrail.")

NAVAL AIR SECTION

CHAPTER XI.

BRITISH NAVAL AIR PROGRESS.

TRANSFER OF THE FLEET AIR ARM.

THE visible progress made during the year in the transfer to the sole control of the Navy of the Fleet Air Arm has been small; that, however, was inevitable. Before the Navy can relieve the Air Force of all responsibility—other than for the design, manufacture and supply of machines, which is to remain solely in the province of the Air Force—it must provide itself with personnel qualified to relieve that of the Air Force now serving with the fleet. Indeed, a greater number than that is needed, for the Fleet Air Arm is expanding as rapidly as any other branch of the Navy, or of any of the defence Forces. This is not a mere matter of providing more pilots; technical officers are also needed, and a whole class of skilled ratings for aircraft maintenance has to be created, since the Navy up to now has had none. An essential preliminary to substantial innovations of this sort is the creation of the organisation at the Admiralty to devise the necessary measures and put them into operation.

The only branch of the Admiralty which formerly dealt with air matters was the Air Division of the Naval Staff. The first action, therefore, was the creation in January, 1938, of two new departments, for Air Personnel and Air Material respectively, with a Captain at the head of each. For the present these branches are under the Fifth Sea Lord and Chief of Naval Air Services—the new title of the office formerly designated “A.C.N.S. (Air),” which was adopted early in the year. They are, however, ordinary administrative departments, and it is to be expected that when the transfer of the Fleet Air Arm is fully accomplished, they will be placed under the Second Sea Lord and Controller, respectively, as are all other similar Departments. The following month, the appointment was announced of a Captain (E) as Technical Adviser to the Chief of Naval Air Services; the officer selected for this post had had previous experience both of the Fleet Air Arm, as Engineer Officer of the carrier flagship, and of the Admiralty in the Department of the Engineer-in-Chief.

A year later, this latter officer took over charge of one half of the two parts into which the Department of Air Material was expanded. The matter of maintenance is of particular importance to aircraft which have to fly over the sea, out of sight, more often than not, of either their parent ship or of land, which cannot therefore afford

to run any risk that can be avoided of forced landings. All aircraft of the Fleet Air Arm fall into this category. The Admiralty have, therefore, created one department which is to devote all its attention to the matter of repairs and maintenance and have relieved it of all responsibility for the organisation of equipment and supply; the latter duties are now attended to by a separate department. Both of these new departments were formed out of the appropriate sections of the original Department of Air Material.

DEFINITION OF THE FLEET AIR ARM.

The term "Fleet Air Arm" has been officially defined (Admiralty Fleet Order 1912/38) as covering all Naval, Marine and Air Force personnel :—

- (a) at Fleet Air Arm shore establishments under naval administration ;
- (b) forming part of a Fleet Air Arm squadron or unit ;
- (c) embarked, for whatever purpose, in naval aircraft ;
- (d) detailed to assist in work involving, or connected with, the handling or maintenance of Fleet aircraft, or other work for which Fleet Air Arm officers may be responsible.

PROVISION OF PILOTS.

One of the chief sources of pilots continues to be the naval and marine officers who specialise in flying who, since the 1923 regime has been in full operation, have provided 70 per cent. of the pilots of the Fleet Air Arm. The Fleet Air Arm is open, as a speciality, to officers transferred to the Navy from the Naval Reserve—originally placed on a "Supplementary List" but now absorbed in the general lists. Pilots are now also being provided from the Naval Air Branch, and from the lower deck, as described in the introductory chapter to last year's "Brassey." Those from the latter source will be employed chiefly on the less highly skilled work required of a pilot, such as target towing and utility flights for various purposes; though, of course, any who show themselves competent for more exacting tasks will have every opportunity of performing them.

THE NAVAL AIR BRANCH.

Commissions are offered, in the first place for a period of seven years, to candidates between the ages of 17½ and 23 who come up to the exacting physical standard prescribed and hold an educational qualification not inferior to "school certificate." The first year of service is probationary and the first two years are devoted to training. Those who enter under the age of 22 are rated Midshipman (A) on entry, and are promoted to Sub-lieutenant (A) at 22, or as soon as they have satisfactorily completed their training, if over 20. Sub-lieutenants (A) will be promoted to Lieutenant (A) after two years' service, subject to recommendation.

STATUS AND DUTIES OF (A) OFFICERS.

Officers of the Air Branch wear the ordinary uniform of their rank with the addition of the badge of the branch—a silver capital “A” surrounded by a laurel wreath in gold—just above the rank stripes on the sleeve or shoulder strap. Their pay and allowances, including flying allowance, are exactly the same as those of officers of corresponding rank on the ordinary lists. Within the Fleet Air Arm, they exercise full powers of command, on an equal footing with naval executive or Marine officers, according to their respective seniority. They are not eligible, however, to command naval units outside the Fleet Air Arm.

The duties of (A) officers afloat are defined to be (Admiralty Fleet Order 1912/38) :—

- (a) Flying, administrative and specialist duties within the Fleet Air Arm, and staff duties in respect of air matters ;
- (b) when not required for duty in connection with aircraft, such general ship's duties, including watch-keeping in harbour, as the captain, having regard to their rank and experience, may adjudge them fit to perform.

Commanding officers are enjoined to arrange for those who need it to receive such training as it is necessary to fit them for these duties.

PERIODS AND CONDITIONS OF SERVICE.

At the end of the first term of seven years, in which at least one period of foreign service will normally be included, officers will be transferred to an “emergency list,” on which they will be borne for another eight years. While on that list they will be required to keep themselves in flying practice—for which facilities will be provided on application—and to undergo periodical naval training. They will be liable to be called up for service in war or emergency, as are officers in other branches of the Reserves.

On transfer to the Emergency list, an officer receives a gratuity of £600 ; while borne on it, and duly undergoing periodical training and flying practice, he draws a retainer of £25 a year. After eight years on the emergency list, he will be transferred to the retired list, and though still liable for service if called up, he will no longer have to do training or keep himself in flying practice.

A certain number of (A) officers, at the end of their first seven years, will be required for further service on the active list instead of being relegated to the emergency list. Those who volunteer to serve on, and who are selected, will do another eight years, being promoted to lieutenant-commander (A) at eight years' seniority as lieutenant. The retiring gratuity at the end of this second term will be £1,600.

Some few may be retained even longer ; if so, they will be eligible for further promotion. If not promoted, they will be eligible for a pension at the age of 40, or after twenty years' service.

STARTING THE NEW BRANCH.

Officers of the Royal Air Force have been allowed, with the approval in each case of the Air Ministry and Admiralty, to transfer to the Air Branch of the Navy. The rank and seniority granted on transfer was calculated according to a scale which took into account their rank and length of service in the Air Force. One officer, Wing Commander B. L. Huskisson, D.S.C., R.A.F., became a Captain (A) on September 1. The December Navy List showed 33 Lieutenants (A), 58 Sub-lieutenants (A) and 14 Acting Sub-lieutenants (A) transferred from the Air Force.

Many of these ex-R.A.F. officers had, of course, considerable experience in the Fleet Air Arm at the time of their transfer, and were thus at once available for full duty. Some of the remainder, though fully qualified in flying, may still have been in the stage of special Fleet Air Arm training, which would have to be completed before they were so available. New entries require a full course of training from the beginning.

The first batch of the latter, 30 probationary officers of whom 10 were Acting Sub-lieutenants (A) and the remainder Midshipmen (A), were entered on April 19. They joined H.M.S. *Hermes*, aircraft carrier in reserve at Devonport, for a two months' course of elementary naval instruction. This is designed, while initiating them into naval air duties, to introduce them to naval routine and life on board ship. From the *Hermes* they moved on in June to No. 23 Royal Air Force Elementary and Reserve Flying Training School at Rochester, for elementary flying training. While there, they were under a naval officer who accompanied them and continued their special naval training in the intervals of flying training. Intermediate and advanced flying training is given at No. 1 Royal Air Force Flying Training School at Netheravon; and on the conclusion of that they undergo specialised Fleet Air Arm training, partly at a naval aerodrome and chiefly in a training carrier.

Further batches of (A) officers were entered later in the year, 41 on July 4 and 53 on November 21. Later, elementary flying instruction was given at Nos. 6 and 10 Elementary and Reserve Flying Training Schools at Sywell and Yatesbury, as well as at Rochester.

In December, it was announced by the Admiralty that the increase in the Fleet Air Arm and the forthcoming transfer of shore bases to naval control would increase the Navy's requirements for captains and commanders with air experience. As a special measure to meet this particular situation, a small number of commanders and lieutenant-commanders possessing experience with the Fleet Air Arm but who had passed out of the normal zone for promotion, would be promoted to Captain (A) and Commander (A). The officers so promoted would be employed chiefly ashore, but might be needed for sea service with the Fleet Air Arm; but being (A) officers they would not be regarded as eligible for command of seagoing ships. In the New Year promotions, two commanders were promoted to Captain (A) and four lieutenant-commanders to Commander (A).

The Admiralty also intimated that a certain number of lieutenant-commanders, R.N., without Fleet Air Arm experience might be needed for duty at naval aerodromes. Such officers, when they had gained the necessary air experience, might be considered for similar promotion into the (A) branch, notwithstanding that they were past the normal zone for promotion.

ROYAL NAVAL VOLUNTEER RESERVE (AIR BRANCH).

The formation of an Air Branch of the Royal Naval Volunteer Reserve was announced on November 18, on the same lines as the Air Branch of the Navy. The physical and educational standards for entrants are the same, but they are taken between the ages of 17, instead of $17\frac{1}{2}$, and 23. On acceptance, officers undergo full-time training for 18 months; on conclusion of that, pilots are required for the next ten years to keep themselves in flying practice and to do 14 days' naval training yearly, or 28 biennially; observers, who are trained in air navigation and similar arts, to undergo 28 days' naval training annually, of which 14 must be consecutive, during the same period. At the end of the 10-year period, officers will no longer be required for duty in the air, but may volunteer for further ground employment.

Pay, when embodied, is at the same rate as in the Air Branch of the Navy; there is provision for compensation for any injuries sustained on service; and there are gratuities of £150 on satisfactory completion of the 18 months' training—part of which is subject to refund unless subsequent periodical practice is duly performed—and £25 for each year of service in which practice is completed. The uniform is the ordinary uniform of the R.N.V.R., with the addition of the "Air Branch" badge.

No entries had been made to the Air Branch of the R.N.V.R. up to the end of the year. As the training resources of the country are so fully occupied with the expansion not only of the Royal Air Force but also of the Fleet Air Arm, it seems possible that the actual inauguration of the new branch may be postponed for the present.

LOWER DECK PILOTS.

The conditions under which ratings might qualify as pilots, which were briefly outlined in the Introductory chapter last year, were promulgated on March 5, 1938. Candidates are taken chiefly from the seaman and communication branches, though men from other branches may be accepted; if so, they will transfer to the seaman branch. Volunteers must be between 21 and 24, must satisfy the Royal Air Force physical requirements in all respects, and must have passed the Higher Education Test. The final selection of candidates is made by the Admiralty.

The training of a pilot from the lower deck lasts a year at shore flying schools, followed by about eight weeks in a training aircraft carrier. On qualifying, pilots will be rated Petty Officer, unless they already hold that rate, and will be available for full flying duties.

While borne for flying duty, they will be paid 5s. a day in addition to the substantive pay of their rate. The normal period of flying duty will be seven years, including the training period. It may be extended for those who volunteer and are found fit.

The first batch, of 20 ratings, was selected in May, the second, of 14, in June. They, like the Air Branch officers, go first to the Royal Air Force Elementary and Reserve Flying Training School, No. 23, at Rochester, and afterwards to the No. 1 Flying Training School, Royal Air Force, at Netheravon for intermediate and advanced training.

MAINTENANCE.

TECHNICAL OFFICERS.

Technical officers in the Fleet Air Arm correspond to officers of the Engineering branch of the Navy ; they will be provided partly from that source and partly from the Air Branch. Lieutenants (E) of not more than 2 years' seniority will be eligible to volunteer ; when accepted they will do two years training, taking a full flying course in the first year, while the second will be devoted to flying practice and aeronautical engineering. After a year as pilot in a catapult ship, officers will then be appointed for technical duties in the Fleet Air Arm, and after two appointments in that capacity will revert to general (E) duty until again required for Fleet Air Arm technical duties in a higher rank.

Officers of the (A) Branch selected to qualify for technical duties will begin specialisation after doing one full appointment for general flying duties. They will then do a two years' course of technical training, in which a course of general engineering will presumably have to precede their course in aeronautical engineering. After training they will be employed continuously on technical duties, and will be retained in service, normally, until qualified for pension. They will be eligible for promotion to Commander (A) and Captain (A).

In order to make immediate provision for technical officers, pending the qualification of those described above, a few more senior naval engineer officers are to be trained in aeronautical engineering, but the flying training will be omitted in their case. Three officers, a Commander (E), a Lieutenant-commander (E) and a Lieutenant (E) were appointed on August 29, to the Royal Air Force School of Aeronautical Engineering at Henlow.

MAINTENANCE RATINGS.

Up to the present, the Navy has possessed no ratings possessing knowledge of the maintenance of aircraft at all, since all maintenance of Fleet Air Arm machines was provided for by men of the Royal Air Force. The provision of these ratings is the largest task that the Navy has to achieve before it is ready to relieve the Air Force of all responsibility for the Fleet Air Arm. 1,000 are needed in the course of 1939, and some three hundred were wanted immediately at the beginning of the year.

Several new rates have been introduced into the Navy for this purpose ; they are of two classes, skilled and semi-skilled. Of the former there are three, Air Artificer, corresponding to Artificers of other trades in the Navy already, Air Fitter and Air Rigger, of which there is no precise equivalent in the Service.

All three enter as Air Apprentices, under the same conditions as other Apprentices, and after three years in the training establishment, go to sea as Air Fitters or Air Riggers—a rate equivalent to Able Seaman. After two years at sea they are qualified for rating up to Leading Air Fitter or Leading Air Rigger, provided they have earned a recommendation for advancement, and at this stage 50 per cent. of them will be selected to qualify, by a further year's training in a training establishment, for Air Artificer. The other 50 per cent. will continue to serve at sea in the Leading rates, during which time about another 10 per cent. will also be selected for Air Artificer. The remainder, not so selected, will be eligible to rise through the rate of Petty Officer Air Fitter and Air Rigger to Chief Petty Officer Air Fitter and Rigger.

Those who qualify for the Artificer branch become Air Artificer 4th class—the equivalent of Petty Officer—and rise through the rates appropriate to Artificers, of which 3rd class and above are Chief Petty Officers. Air Fitters deal with engines ; Air Riggers with air frames ; Air Artificers with one or the other according to their trade qualifications.

The semi-skilled ratings are entitled Air Mechanics, and they are divided into four trades ; engines—E, air frames—A, ordnance—O, and electrical—L. They will be drawn in the first place from able seamen and stokers under the age of 28 who have passed the Educational Test, Part I, and have not taken up any other speciality. Those who are accepted undergo a course of about a year, at an Air Force Training Establishment at present, but at a Fleet Air Arm Training Establishment as soon as one is available ; on conclusion, if they qualify they are rated Air Mechanic—a substantive rating equivalent to Able Seaman—and will be employed in the Fleet Air Arm. They are eligible to rise through Leading and Petty Officer rates to Chief Petty Officer.

The branch is recruited also by men entered direct from the shore. They are taken in as Air Mechanic Probationers between the ages of 17½ and 25, either for seven years followed by five in the Fleet Reserve, or for the ordinary Continuous Service engagement of 12 years. On completion of training, which consists of the ordinary " New Entry " course of about 10 weeks followed by a technical course varying in length from 6½ months for Armament to 12 months for Electrical, they are eligible for confirmation in the rating of Air Mechanic.

TRANSFER FROM R.A.F.

Pending the supply of Maintenance Ratings by the processes outlined above, a certain number are being supplied by voluntary transfer from the Air Force. Men so transferred retain all the

benefits of the service they have already to their credit, which count towards Good Conduct Badges, Long Service Medal, and increase of pension; and they are entitled to a free issue of their new kit on transfer. "Fitters I," in the Air Force become Air Artificers in the Navy; "Fitters II," become Air Fitters or Air Riggers, according to their qualifications; "Flight Mechanics" and "Flight Riggers" become Air Mechanics.

AERODROMES.

The aerodromes to be transferred from the Air Force to the Navy are :—

Lee-on-the-Solent,
Ford (Sussex),
Worthy Down (Winchester),
Donibristle (Fife),

and it is understood, though no official announcement has been made, that the transfer will take place on April 1, 1939. These aerodromes will not provide all the accommodation that the Fleet Air Arm needs, particularly as the two last-named are notoriously cramped and unsatisfactory; but they are all that can be spared by the Air Force, in view of its own expansion now in progress. It will be necessary for new aerodromes to be established, when the sites for them can be selected and acquired, to provide the balance of the accommodation needed.

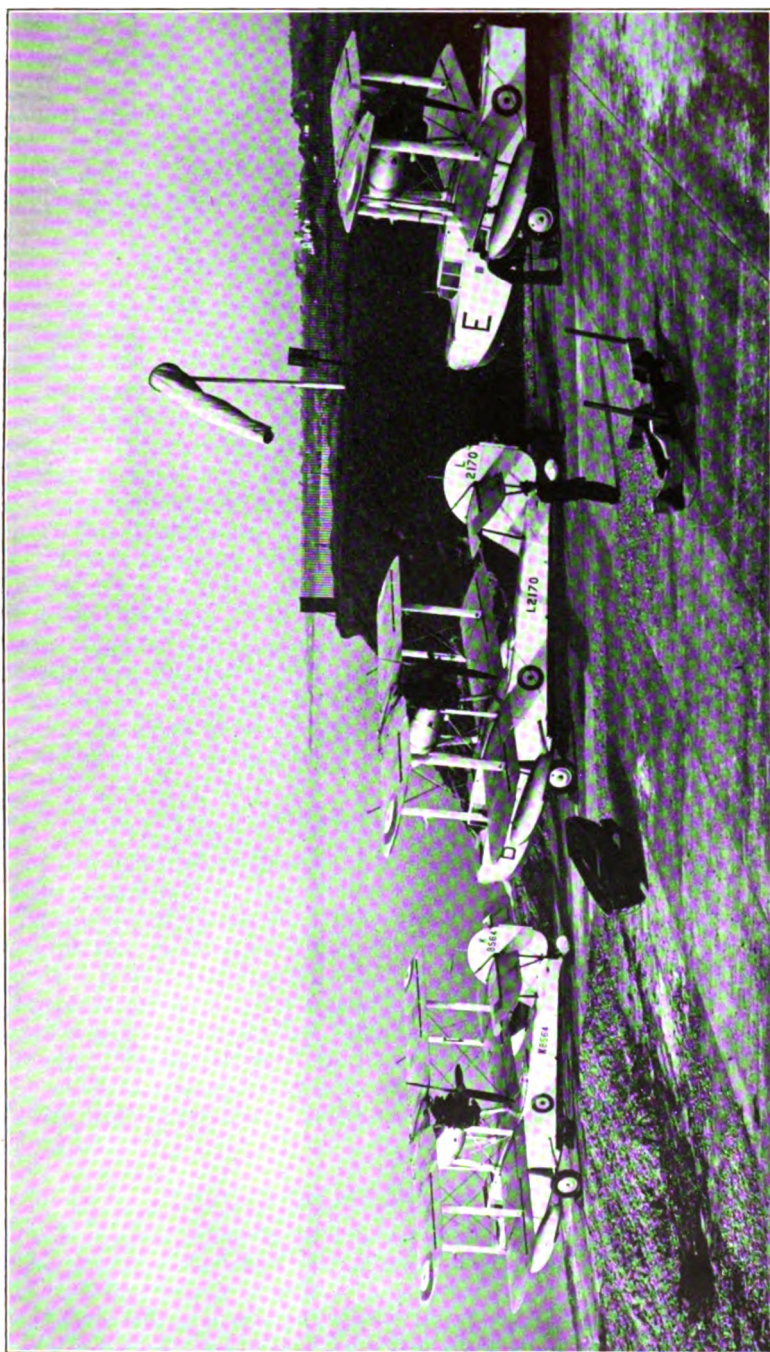
Curiously enough, the aerodrome at Gosport, which is in the heart of naval establishments, has always been the station of the Fleet Air Arm Training Squadron, and is so close to Lee that the two have to be regarded to some extent as one station, is to be retained by the Air Force. The reason for this odd arrangement has not been disclosed.

In the December Navy List, under the heading of Air Force Stations used by the Fleet Air Arm, Worthy Down is not mentioned, but Gosport, Southampton, Netheravon and Mount Batten are. Southampton is a civil aerodrome, of which the Air Force have the use; Netheravon now accommodates No. 1 R.A.F. Flying Training School; Mount Batten is the only station convenient to Devonport.

PERSONNEL AT BASES.

A Flag Officer is to be appointed to command the naval shore air stations, when they come into existence; it is understood that his headquarters will be at Lee. Details of the organisation to be adopted have not been made public, but he is expected to have a captain on his staff, while the individual stations are commanded by Captains (A).

In order to economise the number of active service ratings needed at the naval shore air stations, such duties as guards, working parties, parachute packers, etc., are to be performed by a "Fleet Air Arm Supplementary Party" composed, like the Reserve Fleet



VICKERS-SUPERMARINE "WALRUS" AMPHIBIANS AT LEE-ON-THE-SOLENT.

(By courtesy of Messrs. Vickers-Armstrong and "Flight".)

Supplementary Party, of re-employed pensioners and other discharged naval ratings. All applicants who are accepted are employed initially as Able Seamen, whatever their former rating in the Navy. Pensioners will continue to draw their pensions in addition to pay of the rate in which employed, but they will not earn any increase of pension by their further service. They provide their own (reduced) kit on joining, but draw Kit Upkeep Allowance.

FLEET AIR ARM MANNING DIVISION.

Since a large number of ratings—some 10,000 when expansion is complete—will be permanently employed in the Fleet Air Arm, it is considered necessary that their drafting should be centralised, instead of being carried out by the three Home Port Depots as is the drafting of all other ratings. This is the more necessary since Fleet Air Arm ratings when awaiting draft could not be employed on their proper duties if they were distributed between the three depots. There are, for instance, no aerodromes within reach of Chatham or Devonport Naval Barracks.

A new manning division is therefore to be created, to which all Fleet Air Arm ratings will be transferred. These comprise Rating Pilots, Observers' Mates, Air Gunners, Air Artificers, Air Fitters, Air Riggers, Air Mechanics and Air Apprentices. Pending the creation of this new depot, all the above ratings will be attached to Portsmouth Port Division. The precise position of the Naval Shore Air Base, at which the Fleet Air Arm Division will be located, has not been made known.

FLEET AIR ARM REPAIR AND MAINTENANCE DEPOT.

It is intended to establish, probably somewhere in the Portsmouth district, a Fleet Air Arm Repair Depot—a sort of Aircraft Dockyard. To this depot all naval aircraft in need of repair—other than trivial repair that is done on board ship—or substantial overhaul, will be sent. It is to be expected that the training establishment for maintenance ratings will be organised in conjunction with this depot, and it seems probable that there may be eventually more than one of them. The functions of the Fleet Air Arm Supply and Repair ship, of which the provision was announced in the building programme of 1938, will come midway between those of a carrier and of the aircraft dockyard.

DISPOSITION OF THE FLEET AIR ARM.

The carrier *Argus*, which has been for some years in reserve, was commissioned at Devonport on August 9, as a parent ship for Queen Bee target aircraft; she is also employed on the training of pilots in deck landing to relieve the pressure on the regular training carrier. She carries a "Fleet Requirements Unit" of the Fleet Air Arm, of which the function is to provide such co-operation as the fleet requires—in photography, and the provision of spotting or target aircraft for practices, other than Queen Bees which are to

remain in charge of the Air Force even when used at sea. She is fully equipped for photographic duties and carries a special section for the work.

The new carrier Ark Royal was commissioned on completion on November 16, and hoisted the flag of Rear-Admiral G. C. C. Royle, Commanding Aircraft Carriers, shortly afterwards. The Fleet Air Arm units hitherto carried by the Courageous, the former flagship, transferred to the Ark Royal, together with two newly-formed squadrons, one of fighters and one of Torpedo-Spotter-Reconnaissance planes. The Ark Royal's complement when carrying all her aircraft is 138 officers and 1,355 men—about 15 per cent. greater than that of the Courageous and Glorious.

After relief by the Ark Royal, the Courageous underwent a short refit and was then allocated as Home Fleet Training carrier in place of the Furious, whose units she took over. The Furious was then taken in hand for refit.

The disposition of Fleet Air Arm units at the end of 1938 was as follows.

CARRIER-BORNE UNITS.

Ship.		Squadron or Flight.
Ark Royal.	Home Fleet.	800 and 803 (F)
Flag of R.A.	Aircraft Carriers	814, 820 and 821 (TSR)
		810 (TR)
Courageous (Training)	. . . . .	801 (F)
		822 (TSR)
Hermes		Officers under training
Argus		Fleet Requirements Unit
		Photographic Section
		Queen Bee Unit (R.A.F.)
Glorious.	Mediterranean	802 (F)
		812, 823 and 825 (TSR)
Eagle.	China	813 and 822 (TSR)

CATAPULT UNITS.

Nelson.	Home Fleet.	702 Flight (TSR)
2nd Cruiser Squadron.	Home Fleet	712 Squadron (FR)
1st Battle Squadron.	Mediterranean	701 Flight (FR)
1st Cruiser Squadron.	Mediterranean	711 Flight (FR)
3rd Cruiser Squadron.	Mediterranean.	713 Flight (FR)
4th Cruiser Squadron.	East Indies	714 Flight (FR)
5th Cruiser Squadron.	China	715 Squadron (FR)
8th Cruiser Squadron.	America	718 Squadron (FR)

UNITS ASHORE.

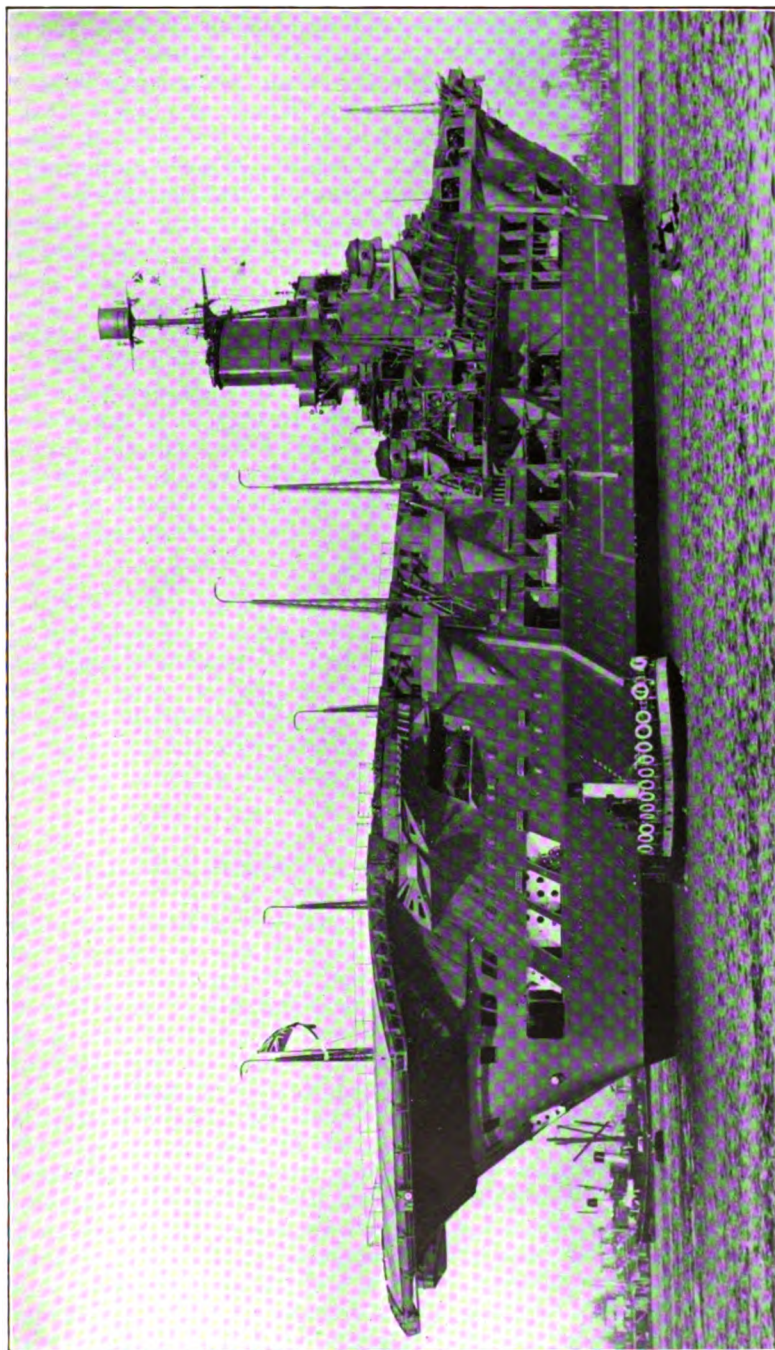
Training Squadron	Gosport.
School of Naval Co-operation . .	Ford.

NEW DEVELOPMENTS.

HELICOPTERS.

It has been stated in the press that four helicopter machines are on order for the Fleet Air Arm, but details have not been made public. Development of the type continues in France and Germany.

The von Asboth helicopter in Paris began as a small machine with a 180 horse-power engine driving two coaxial propellers of 16 ft. 4 in. diameter in opposite directions. It lifted 1,320 pounds at an



H.M. AIRCRAFT CARRIER ARK ROYAL.

Commissioned for service, November 16, 1938.

(Photo by Stephen Cribb.)

initial rate of climb of about 14 ft. per second. The next model is to have 36-ft. propellers and is expected to lift 2,210 lb. at 29 ft. per second. A still larger model is projected with 55-ft. propellers, and a 2,000 horse-power engine; it is expected to lift 4,300 lb. useful load vertically to 20,000 ft. in $9\frac{1}{2}$ minutes, and by tilting the propeller is expected to achieve 270 miles per hour forward speed. The landing speed in all these models in the event of engine failure—i.e. “autorotational” descent—is designed not to exceed 16 ft. per second; so that even a forced landing should be quite safe in restricted space, provided that the pilot has directional control in such a contingency. This directional control during “autorotational” descent seems to be one of the most difficult problems to solve in this type of machine.

The Fock-Wulf helicopter is the most efficient of those which are being developed in Germany. In June it secured the record for helicopters by a flight of 143 miles, from Bremen to Ransdorf near Berlin. It has two 3-bladed lifting propellers of 65 ft. diameter, driven by 160 horse-power Brandenburg engines. Its initial rate of climb is about 8 ft. per second, and it is capable of hovering or of flying backwards.

EXERCISES.

Most of the sea exercises of the year in which air forces, whether of the Fleet Air Arm or of the R.A.F. played a substantial part are described in Chapter I. From the air rather than the general point of view, however, there are certain points to which it is of interest to draw attention. The following notes do not contain complete accounts of the exercises to which they refer, and they should therefore be read in conjunction with the relevant parts of Chapter I.

SINGAPORE.

The earliest exercises of the year were those at Singapore in February. There, as usual, air forces had almost the largest part, since the exercises were in great part a test of the adequacy of the air defences of the fortress. Two points of particular interest emerge from the published reports of the exercises. The first is that aircraft from H.M.S. Eagle, which was over 200 miles away, delivered an attack on the Air Base at Singapore soon after dawn. This indicates that the Fleet Air Arm has made great advances in the art of night flying at sea, a subject to which reference was made in this chapter last year. The second point of interest is the fact that the weather in that part of the world is often such as completely to neutralize the efficiency of aircraft for reconnaissance. The scouting aircraft of the defence had located “a large naval force” 100 miles from the fortress on the afternoon of one day, but lost touch with it shortly afterwards in heavy rain. The rain lasted until nightfall, and the aircraft did not recover touch with the enemy at all. This incident possibly contributed to the decision, stated to have been reached as a result of the exercises, that they had demonstrated the need for strengthening the air forces forming part of the garrison of the fortress.

BAY OF BISCAY AND CHANNEL.

In the usual exercises arranged during the return to England of the Home Fleet at the end of March from the Spring Cruise, the range of the reconnaissance for which the shore-based General Reconnaissance Squadrons were called upon was greater than it had been in former years. The southern boundary of the exercise area was the latitude of Cape Finisterre, 500 miles from the Cornish coast ; but as the Fleet did not pass into the area until just after dark on the first day of the exercises, the aircraft did not need to search quite so far south as that.

In view of the greater depth of search prescribed, the area was limited laterally to a width of 80 miles. The battlefleet was regarded as representing a convoy of troopships, and the remainder of the Home Fleet—6 cruisers, 1 aircraft carrier and 3 flotillas of destroyers—as its escort. Up to the line Falmouth-Ushant it was subject to attack by submarines—of which there were 10—under the command of the Rear-Admiral (S), Rear-Admiral R. H. T. Raikes, flying his flag on shore, with which the General Reconnaissance Squadrons, under the Air Officer Commanding Coastal Area, were to co-operate. After crossing that line it would be subject to bombing and torpedo-bomber attack from shore-based air forces, and an attack by the motor torpedo boats based at Portsmouth.

The original patrol force consisted of five flying-boats from Nos. 201 and 228 Squadrons. They took off from Plymouth at 3 a.m. on Monday, March 28. The weather was not too favourable, for the base of the clouds over the Bay of Biscay varied between 200 and 600 feet ; but the patrol scheme adopted was adequate to the restricted area to be covered, and the Fleet was located by one of "London" flying-boats of No. 201 Squadron at 7.7 a.m., when 200 miles south-west of Ushant. The exact position, however, was somewhat in doubt as, owing to low cloud, the flying-boat which made contact with the Fleet had not succeeded in making a landfall at Ushant to get a departure on her way out. Her reports were therefore not so helpful to the submarines of her side as they might have been, but they were sufficiently accurate to enable the other flying-boats on patrol to carry out their prescribed manoeuvre of closing in on the Fleet and all making contact. One of the fast "Stranraer" flying-boats of No. 228 Squadron was left to shadow the Fleet, and the remainder of the original patrolling force then returned to their base. The aircraft in contact with the Fleet was relieved periodically, and touch was maintained all day.

The *Courageous's* aircraft confined themselves to anti-submarine work, and there was therefore no air fighting. Both they and the destroyers of the convoy escort claimed to have destroyed submarines which endeavoured to attack the convoy. A feature of such exercises which is not uncommon was also noticed on this occasion, in the shape of a difference of opinion between ship and flying-boat as to what is practicable when shadowing ships in the weather conditions prevailing—which are very frequent in these Atlantic latitudes. It appeared to those afloat that the flying-boat, in order

to carry out its reconnaissance and shadow the ships by keeping in touch with them, both approached and remained much closer to them than would be possible if the ships' anti-aircraft guns had been actually firing. On the other hand, it appeared to those in the air that they could easily have regained the cover of the clouds at any moment if anti-aircraft fire began to come uncomfortably close, and that there was no appreciable danger in an occasional closer approach. This conflict of opinion would not appear possible of resolution without war experience; but it may be remarked that the ideal to be aimed at by the aircraft in such circumstances is that the enemy should be located and shadowed without his being aware of it. If that were achieved, no argument such as that mentioned above could arise at all.

The air forces lost touch with the convoy at night, and the latter crossed the Falmouth-Ushant line at 7 a.m. on Tuesday. Aircraft attacks were frequent throughout the day but the motor torpedo boats' attack was not possible, owing to the withdrawal, before the Fleet came within their range, of the aircraft reconnaissance on which the torpedo boats had relied. It was disappointing that this opportunity of practising co-operation between the two arms was lost.

It seems probable that the weather conditions which prevented the flying-boat which located the Fleet from sighting Ushant were also responsible for the loss of the flying-boat which disappeared that day. Low cloud is one of the most dangerous enemies of the military flying-boat, which must come down to sight the surface of the sea if it is to carry out its duty of searching the sea. The maxim of the skilled air navigator is, of course, "if in doubt of position, go up"; but it is of little use to the sea patrol to obtain the most accurate of positions by astronomical observations above the clouds, if nothing is known of what is happening on the surface of the sea. It is not only in their exposure to the risks of combat that the task of the combatant flying-boat's company is more dangerous than that of the civilian.

One of the aircraft which was in touch with the Fleet in the Bay of Biscay up to dark on the Monday had to seek its assistance after dark, in order to verify position before returning to base.

IRISH SEA.

From June 6 to 20 the Flying-boat and General Reconnaissance Squadrons carried out exercises in conjunction with the 1st Anti-submarine Flotilla and the 5th and 6th Submarine Flotillas, under the command of the Rear-Admiral (S), who flew his flag in the *Enchantress*. The naval units engaged in the exercise cruise in the course of it as far north as Oban and Campbeltown. The exercise is a normal item in the summer programme, but no details of it were made public.

COAST DEFENCE EXERCISE.

In the first part of this exercise two points of particular interest are to be noted. The first is that the aircraft from the *Courageous*, representing those of an enemy, delivered simultaneous attacks on

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Rosyth, Montrose, Leuchars and Thornaby at dawn—an achievement similar to that of the Fleet Air Arm units of the Eagle at Singapore earlier in the year. The second is that the aircraft of the defending side—Red—consisting of three squadrons of flying-boats and five of Ansons, in the course of the first day of the exercises had located the whole of the attacking naval forces in the North Sea. A Blue cruiser was located north-east of the Orkneys as early as 7 a.m. At 2 p.m. the main body of the Blue Fleet was located 150 miles east of the Tyne. At 8.30 p.m. the remainder of the Blue Fleet, two cruisers and three destroyers, were found 75 miles east of Lowestoft.

This was an example of what an adequate air force could accomplish in favourable weather conditions; but the following day, July 21, provided an example of its limitations. From early dawn until 6 p.m. air reconnaissance was impossible owing to low visibility. Blue ships were able to deliver attacks on Red bases without the defences receiving prior warning or Red naval forces being able to interfere—though this does not indicate a condition of danger, since the object of this part of the exercise was solely to provide the forts with targets. The fortifications themselves are capable of holding their own against attack, and their very existence makes it unlikely that they would be actually attacked in war; but the bases, or other points of importance which they protect, certainly would be if the forts were not there. The following day was again clear, and Red air forces were again able to find and keep touch with the whole of the Blue forces in the North Sea throughout the day.

It is sometimes said that with the advent of air forces the British Islands have lost the advantage of insularity. In one sense that generalisation is sound, in that sea forces alone can no longer keep them inviolate from an enemy's blows. But so far as real invasion is concerned, in force sufficient for an enemy to have any chance of establishing military forces ashore in this country, the advent of air forces has made it more difficult than ever. The possible efficacy of the manœuvre of dropping showers of soldiers by parachute is outside the scope of discussion in this volume.

THE EMPIRE AIR BASE.

No little discussion has taken place, in which the Admiralty, Air Ministry and local authorities have all been concerned, regarding the location of the principal Air Base for the Empire Air Services. The modern tendency, as pointed out more than once in recent years by contributors to "Brassey," is for these to be carried on by flying-boats; but it is also necessary, for full efficiency, that the base should provide accommodation for land-planes as well. For some years a proposal was under discussion for establishing the base in Langstone Harbour, the large shallow harbour which adjoins on the east side the island on which Portsmouth stands. The municipal aerodrome of Portsmouth adjoins Langstone Harbour, so that, provided it could be made suitable for flying-boats, from a technical point of view the site was suitable.

The Admiralty viewed the proposal without favour, since it would entail a large and increasing civil air traffic in close proximity to the premier naval base and chief naval training centre, which might well interfere seriously with certain essential naval services which are carried on chiefly there. Nevertheless, they did not oppose the project, and were prepared to modify their arrangements if necessary, in order not to put obstacles in the way of a highly desirable Imperial development, which would also be of civic advantage to Portsmouth.

Langstone Harbour being shallow and tidal, the establishment of the base there, and the provision of a proper lake for flying-boats, would entail either extensive dredging or damming the mouth of the harbour. This meant that the cost would be very high ; and as the financial assistance offered by the Air Ministry was limited, the City Council of Portsmouth finally decided that they could not undertake it. The project was therefore dropped, and the Empire Air Services continued to be operated from Hythe, Southampton Water, where the local authorities promised certain improvements in the facilities available there.

Southampton Water, however, is not considered satisfactory by many well qualified to judge, and further experience of working from there has not lessened the disadvantages. It is much frequented by shipping, yachts and boats ; it is restricted in some directions and too open in others, so that in some weathers it is very difficult for boat-work ; and it is some distance from the nearest land aerodrome. For these reasons the Langstone Harbour project was revived in 1938. By this time, however, the Admiralty were no longer willing to acquiesce, as they had been three years earlier. The essential services which would be affected by the commercial use of Langstone Harbour, and which would have had to be provided elsewhere if it had been so used, had been developed in the interval owing to the expansion in the Navy, and could not then be moved or interrupted without grave disadvantage. If the unsuitability of Southampton Water for the Empire Air Base had been definitely proved, some place other than the very costly Langstone Harbour would have to be found.

Recently it has been suggested in the press that an ideal location is available in Pagham Harbour, a little further eastward along the coast, between Selsey Bill and Bognor. Pagham Harbour is much smaller than Langstone Harbour, but is large enough to give the mile free run in any direction required by the big flying-boats. It is derelict, since it was once reclaimed, but the sea has since broken in again. The adjoining land is flat, and an aerodrome could, it is said, be made without difficulty or great expense. The land is said to be obtainable at a reasonable price ; communications, by both road and rail are good up to a few miles away. The whole expense of establishing what is needed for the terminus of the Empire air services on this site should be, it is alleged, quite moderate, as such developments go. The matter, at the time of writing, had not got beyond the stage of discussion.

DOMINION CO-OPERATION.

The Air Mission which went to Canada—and the United States—in April, 1938, to investigate the possibility of aircraft supplies from across the Atlantic, comprised a naval officer from the Air Material Department of the Admiralty. This was taken as an indication that amongst the machines which were to be obtained from trans-Atlantic sources might be part of the equipment of the Fleet Air Arm. This seemed inherently probable, since the United States Navy is far ahead of any other in naval air matters, and there is generally fairly close co-operation between manufacturing firms in Canada and the United States, so that Canadian firms might be expected to be very well qualified to supply Fleet Air Arm material. The details of the arrangements concluded by the Mission were not, of course, made public.

In the event of war, co-operation between the Navy and the Air Forces of the Dominions is likely to be of great importance. The Union of South Africa, for instance, maintains no naval forces, but is engaged on building up a substantial air force. In the event of necessity arising for the defence of the Union against attack by sea, this would be the Dominion force which would be of greatest efficacy, and its duty would be almost wholly co-operation with the Royal Navy up to the point, if it were ever reached, when it might have to turn its attention to coast defence.

The Dominion of New Zealand, too, has established an Air Force as a separate service and is increasing it. Liaison is maintained with the R.A.F. in the matters of training and equipment, many officers in the New Zealand Air Force having held short-service commissions in the R.A.F. before returning to their native land. The units carried in the cruisers of the New Zealand Division of the Royal Navy are, of course, units of the Fleet Air Arm, and are manned by naval personnel like other aircraft carried in catapult ships of the Navy. The relations between the Fleet Air Arm units embarked in those ships and the New Zealand Air Force will, after the completion of the Fleet Air Arm transfer, be precisely similar to those existing at home between the Fleet Air Arm and the R.A.F.

The position is very similar in the Commonwealth of Australia Coast defence such as, for instance, of the new base now in course of being established at Darwin, depends largely upon air forces. Amongst the chief duties of these forces, in the event of war, would be co-operation with naval forces.

H. G. T.

CHAPTER XII.

FOREIGN FLEET AIR ARMS.

I.—GENERAL POLICY.

DURING the year 1938 there was considerable expansion in foreign naval air forces, particularly in regard to carrier-borne and shore-based aircraft. The slight increase in ship-borne aircraft is attributable to the general naval expansion, but it now appears to be realised in all countries that this type of aircraft suffers from serious operational limitations.

CARRIER AIRCRAFT.

There have been no major developments in this branch of foreign fleet air arms, but the building programmes of the principal naval powers show that considerable expansion will take place during the next few years.

UNITED STATES.

The United States Navy appears to have realised the difficulty of operating a large number of different types.

Each of the aircraft carriers is now equipped with one squadron (18 aircraft) of each of the following types:—bomber, fighter, scouting, and torpedo. In addition each ship carries a small utility unit of amphibians for miscellaneous duty, such as sleeve target towing. In all, each ship now carries approximately 77 aircraft.

JAPAN.

The Japanese aircraft carriers are now equipped with three types of aircraft—fighters, dive-bombers, and torpedo-bombers, the latter being suitable for reconnaissance.

The Soryu, which has joined the fleet, probably carries three or three and a half squadrons, 36–42 aircraft. The Akagi has been undergoing an extensive refit during the year and should now be ready to rejoin the fleet.

FRANCE.

No change has taken place in the complement of the Béarn which continues to carry fighter, torpedo-bomber, and short-range reconnaissance squadrons. One new aircraft carrier, the Joffre, has recently been laid down and the second one, the Painléve, will follow shortly.

GERMANY.

The first of the two new aircraft carriers, the Graf Zeppelin, was launched in December and the other is likely to follow in the spring.

AIRCRAFT IN CAPITAL SHIPS AND CRUISERS.

Although the difficulty of operating aircraft in the open sea appears to be realised, provision is made in nearly all new construction ships for a certain number of aircraft. A number of ships have been fitted with some form of landing net, operated either from a boom amidships or from the stern, but it appears that this device does little to aid the recovery of an aircraft in a seaway.

UNITED STATES.

The United States Navy continues to carry a large number of aircraft in fighting ships. The " Brooklyn " class, although equipped with hangar space for 8 aircraft, only carry 4 aircraft as a normal peace complement. Other cruisers each carry 4 aircraft, and battleships 3.

JAPAN.

Japanese battleships each carry 3 aircraft, and the cruiser complement varies from 1 aircraft in the small cruisers to 4 aircraft in the larger types.

FRANCE.

One aircraft is carried in each small cruiser and 2 aircraft in each large cruiser ; there is, however, provision for a maximum of 3 to 4 aircraft in cruisers of all types. The Dunkerque, Strassburg, and new battleships each have accommodation for 4 aircraft, but only 2 are carried in the Dunkerque.

GERMANY.

Provision is made for 2 aircraft in each of the German Armoured Ships and cruisers.

ITALY.

The Italian cruisers are now equipped with single float two-seater seaplanes. The complement varies from 2 to 4, but not more than 2 are actually carried in each ship. One submarine can carry a small seaplane.

SOVIET RUSSIA.

Most of the battleships and cruisers carry 1 or 2 floatplanes or flying-boats, but some of them have stowage for 4. Five destroyers can also operate a small seaplane.

SWEDEN.

The aircraft-cruiser Gotland carries 8 seaplanes, but has space for 11.

OTHER NAVIES.

The Netherlands cruisers and Portuguese escort vessels also carry aircraft.

SEAPLANE CARRIERS AND TENDERS.

Seaplane carriers, used to house and transport small seaplanes, are used extensively by the Japanese, and also find favour with certain other countries. Tenders are used, mainly by the United States, as mobile fuel and supply bases for large flying-boats.

UNITED STATES.

The Langley, Wright, and 9 smaller vessels are now used as tenders for the patrol flying boats of the "Scouting Force." The Langley is still fitted with a small flight-deck and can operate carrier-borne aircraft in emergency.

JAPAN.

The Japanese have 3 seaplane carriers in commission, the Chitose, Kamoi, and Notoro. The two latter are old and will probably be replaced by the Chiyoda and Mizuho which are now under construction.

The value of these carriers in a major naval war is problematical, but there is no doubt that great use of this type of vessel can be made in operations such as those now going on in China.

FRANCE.

The seaplane carrier Commandant Teste carries two squadrons, of torpedo-bomber and short reconnaissance types.

Orders have been placed for four aircraft supply ships, the Sans Souci, Sans Peur, Sans Reproche, and Sans Pareil. It is probable that these ships will be used, as in the United States Navy, as tenders for flying-boats.

ITALY.

The seaplane carrier Miraglia has been in use as a transport for aircraft and stores. It is unlikely that this ship will revert to her previous duty as a seaplane carrier.

GERMANY.

The German navy possesses no seaplane carriers, but several small tenders are used by the German Air Force. One of these, the Hans Rolshoven, is base and repair ship for a squadron of small seaplanes.

RUSSIA.

The icebreaker Stalin has been constructed as a seaplane carrier, with a complement of over 20 aircraft. It is reported that other icebreakers will be converted for a similar purpose.

SHORE-BASED NAVAL AIRCRAFT.

All the major naval powers possess a number of aircraft whose primary function is co-operation with naval forces in reconnaissance, coast defence, and the protection of shipping. The system of administration and the operational control of these shore-based forces differs widely in different countries, but in all cases the personnel receive special training in the work of naval co-operation.

UNITED STATES.

The majority of the patrol flying boats, which were previously attached to the Base Force, have now been transferred to the Scouting Force of the Fleet. This means, in effect, that they can operate with the fleet in almost any area and no longer suffer the limitations of shore-based aircraft.

Two squadrons of utility aircraft remain attached to the Base Force and in addition are 6 shore-based squadrons of the U.S. Marine Corps.

The total number of patrol flying boat squadrons will be increased to 22, comprising 264 aircraft.

JAPAN.

Japanese shore-based naval air forces consist very largely of twin-engined bombers which are designed primarily for coast defence. There are in addition a number of flying boats for long-range reconnaissance work.

FRANCE.

Long-range reconnaissance flying boats are stationed on the west and south coasts of France, in North Africa, and at Tahiti. There are also several squadrons of bomber and torpedo aircraft.

ITALY.

The naval co-operation squadrons of the Italian Air Force consist mainly of large float-planes. Their duty is primarily reconnaissance, but the newer types are also capable of carrying a considerable bomb load. These aircraft are stationed round the Italian coast, in the Dodecanese, and a small number in East Africa.

GERMANY.

The naval wing of the German Air Force is very largely under Air Force control, although a large number of naval officers are included in its personnel. The aircraft consist of reconnaissance and torpedo types.

II.—ORGANISATION IN DETAIL.

UNITED STATES.

POLICY AND ORGANISATION.

Early in 1938 Rear-Admiral Cook announced a new expansion programme, including the provision of 950 aircraft, at a cost of

£21,200,000. This programme will increase the number of naval aircraft to 8,000 of all types, including the following :—

428 patrol bombers,
175 training aircraft,
80 aircraft for a " Naval Aircraft Tactical School."

The total strength of the Naval Air Service is at present about 1,500 aircraft, including some 700 aircraft used for training and non-combatant duties but excluding reserves. During 1939 the first line strength will be increased principally by the addition of aircraft for the Wasp and expansion of the patrol flying boat units, and should reach 950 combatant aircraft before the end of the year. It may be assumed that the expansion programme includes provision for a considerable increase in reserve aircraft.

PERSONNEL.

Rear-Admiral A. B. Cook continues as Chief of the Bureau of Aeronautics, Vice-Admiral E. J. King has assumed command of the aircraft of the Battle Force, and Rear-Admiral C. A. Blakely commands the aircraft of the Scouting Force.

The Aviation Cadet scheme, described in the 1937 edition of " Brassey," has proved to be a great success. About 500 of these cadets have now been trained and they will form about 80 per cent. of the officer personnel of each squadron.

A number of " enlisted men " are employed as pilots in fighter squadrons in the aircraft carriers.

AIRCRAFT CARRIERS.

The 5 aircraft carriers are attached to the Battle Force and are now organised as follows :—

Division 1—Saratoga (flagship), Lexington, Ranger.
Division 2—Enterprise, Yorktown.

All carriers are equipped with a similar complement of 72 aircraft with an additional utility unit.

The aircraft carrier Wasp is nearly due for completion and will be allotted a complement of aircraft similar to that of the other carriers. It is reported that the sister ship which has been authorised will be named the Hornet.

BASES.

Steps have been taken to increase the accommodation at Alameda (San Francisco), Coco Solo (Panama Canal Zone), and Norfolk.

SERVICE AIRCRAFT.

The following types are now in service :—

<i>Carriers.</i>	Fights—Grumman F3F1, F3F2, and F3F3.
	Scout bombers—Vought SB2U1.
	Curtiss SBC3 and SBC4.
	Torpedo bombers—Douglas TBD1.
	Bombers—Northrop BT1.
<i>Ship-borne.</i>	Scout-observation—Curtiss SOC3.
<i>Flying-boats.</i>	Patrol-bombers—Consolidated PB1.
<i>Miscellaneous.</i>	Utility—Grumman J2F1.

Amongst new types of flying boat are the Sikorsky XPBS1, a four-engined aircraft weighing about 26 tons, and the Consolidated XPBY2, an aircraft of similar size.

A new type of aircraft has recently been developed by the Hall Aluminium Aircraft Corporation for coast defence work. This is the XPTBH2, a large twin-engined float-plane, equipped to carry torpedoes.

The Brewster XF2A single-seater fighter dive bomber is being developed as a fighter for aircraft carriers.

LIGHTER-THAN-AIR CRAFT.

It appears that the question of the construction of a large airship has been shelved for the time being. Tenders have, however, been invited for the construction of an airship, of one million cubic feet capacity, which will be used for experimental purposes and for training.

A non-rigid airship of 400,000 cubic feet capacity was completed in December, 1938. This craft, which has a speed of 50 knots and a reputed endurance of 60 hours, will be used for coastal patrol work and carries a crew of 8.

The American navy has several smaller airships which are now used only for the training of personnel.

JAPAN.

The number of ship-borne aircraft available is now approximately 350, including some 200 carried in the 5 aircraft carriers Kaga, Akagi, Soryu, Ryujo, and Hosho. The commissioning of the Hiryu should bring the total up to 392, as contemplated in the Replenishment Plans previously announced.

The strength of shore-based aircraft must now be in the region of the Replenishment Plan figure of 472, to which must be added a certain number of squadrons formed temporarily for service in connection with the war in China.

PERSONNEL.

The system of entering "Flying Cadets" has been continued, and it appears probable that the majority of pilots are now Warrant Officers or ratings.

AIRCRAFT CARRIERS.

The aircraft carrier Soryu and the seaplane carrier Chitose are now in service. The carrier Hiryu and seaplane carrier Chiyoda must now be completed and may be expected to commission early in the year. Little is known of the progress made in the construction of the third ships of each of these classes, the Koryu and the Mizuho, nor as yet is there any information regarding future construction programmes.

SERVICE AIRCRAFT.

Owing to the China war a large diversity of types are in service, but the general tendency will undoubtedly be for the older types

to be used up quickly. Thus complete re-equipment with modern types is likely to be accelerated by the war.

The principal new types of carrier-borne aircraft in use are :—

- Type 96 Fighter. A low-wing monoplane with a top speed of over 180 knots.
- Type 96 Dive-bomber.
- Type 95 Torpedo-bomber. A biplane developed from the earlier types 89 and 92.

SHIP BORNE FLOAT-PLANES.

- Type 94. A twin float, 3-seater aircraft. Top speed, 143 knots. Range, 525 miles.
- Type 95. A single float, 2 seater.

FLYING-BOATS.

- Type 90-2. 3-Engined monoplane. Top speed, 120 knots. Range, 1,600 miles.
- Type 91. 2-Engined monoplane. Top speed, 120 knots. Range, 2,300 miles.

LAND BOMBERS.

- Type 96. 2-1,000 h.p. "Kinsei" engines. Top speed, 215 knots. This aircraft has been used extensively in China and appears to have a considerable range.

FRANCE.

POLICY AND ORGANISATION.

There appears to have been little change in the complement of the Aéronautique Navale during the past year. The total strength is about 260 aircraft of which some 80 are ship-borne.

Progress in the production of replacement aircraft has been slow and has given rise to much criticism in the French Press.

SERVICE AIRCRAFT.

The following types are in service :—

- | | | |
|-------------------------|--|--------------------|
| Carrier-borne aircraft. | { Dewoitine 373 single-seater fighter. Top speed, 200 knots.
PL7 bomber.
PL10 short-range reconnaissance. } | Obsolescent types. |
| Shore-based. | { Brèguet 521 long-range flying-boat.
Latécoère 302 and 523 long-range flying-boats.
LEO257 float-plane torpedo bombers. Top speed, 120 knots. | |
| Ship-borne. | GL812 float-plane. | |

Among new types coming into production are the Brèguet 370 4-engined flying-boat with a reputed range of 5,000 miles and the LN130 high-wing monoplane flying-boat for catapult ships.

GERMANY.

POLICY AND ORGANISATION.

The Naval Wing of the German Air Force is responsible for all aircraft required for coast defence as well as for the supply of ship-borne aircraft.

PERSONNEL.

Personnel are provided by the Air Force, but a large number of young naval officers are seconded to the Air Force for training, and it appears probable that officer personnel of aircraft embarked in

ships will all be naval officers. A number of the pilots are airmen (ratings).

AIRCRAFT CARRIERS.

The first of the two new aircraft carriers, the Graf Zeppelin, was launched in December, 1938, and may be expected to commission towards the end of 1939. The complement of these ships is 40 aircraft, and it is reported that the ships are partially armoured. No indication has yet been made of the types of aircraft to be carried.

SERVICE AIRCRAFT.

The Heinkel 60 is still in use in catapult ships but will probably be replaced shortly by a more modern type.

Shore-based aircraft are mainly Heinkel and Dornier types.

ITALY.

POLICY AND ORGANISATION.

The first-line strength of naval co-operation aircraft does not appear to have been increased and is still in the region of 200 aircraft. These aircraft are all designed primarily for reconnaissance.

About 48 aircraft are embarked in units of the fleet, but the seaplane carrier *Miraglia* is no longer used. The Italian Government appears to have decided that aircraft carriers serve no useful purpose in the defence of Italian territory, since shore-based aircraft are capable of covering the narrow waters of the central Mediterranean.

SERVICE AIRCRAFT.

The aircraft embarked in ships are Alfa Romeo Ro. 43 seaplanes with a top speed of 170 knots. Naval co-operation aircraft are Cant Z501 seaplanes which will probably be replaced gradually by the Cant Z506B. The latter aircraft is a three-engined float-plane with a maximum speed of about 210 knots and is capable of carrying either a torpedo or a corresponding bomb load.

PORTUGAL.

Little change has taken place in the Naval Air Service during the past year, but it is probable that steps will soon be taken to re-equip the service with more modern types of aircraft. Some "Ospreys" are at present stationed at Macao and some "Sharks" at Lisbon.

HOLLAND.

Expansion and re-equipment of the Netherlands East Indies naval air forces has made considerable progress during the year. There is now a first-line strength of some 70 aircraft, principally Dornier flying-boats. These aircraft are being built in Holland, under licence.

The cruisers *Java* and *De Ruyter* each carry two Fokker seaplanes. It is intended to organise the East Indies naval forces into four

units, each consisting of 1 cruiser, 4 destroyers, 4 submarines, and 12 torpedo-bomber aircraft.

SOVIET RUSSIA.

The majority of battleships and cruisers are equipped to carry either one or two seaplanes, and some of the destroyers can also carry a small float-plane. The icebreaker Stalin is equipped to carry seaplanes.

Shore based naval co-operation units form a separate branch of the Soviet Air Force. These units are stationed principally in the Baltic, Black Sea, and the Far East. The total strength is believed to be in the region of 300 aircraft of all types. A large number of flying-boats are used and of these the majority are adapted from American types. The Consolidated PBY-1 will probably be built in Russia shortly and a large 4-engined Martin flying-boat has recently been built in the U.S.A. for the Soviet Government.

OTHER COUNTRIES.

Little change has taken place in the naval air forces of minor naval powers.

Both Norway and Denmark employ torpedo aircraft in connection with coast defence.

The Polish press has recently stressed the necessity for increasing the size of the navy and has advocated the construction of an aircraft carrier.

“VIGILANT.”

CHAPTER XIII.

THE INTERDEPENDENCE OF HOME DEFENCE AND COMMERCE PROTECTION.

THE immediate re-actions in this country to the crisis in September, 1938, have thrown the question of Home Defence into stronger relief than at any time since the Napoleonic wars. In the United Kingdom, in fact, we have never as a people had to study very carefully the question of home defence since the fall of Napoleon. Although there have been minor panics it has never been a burning question to us in the same way that it has to Continental countries ; we have had the sea as a barrier, as a bulwark to the castle of the Englishman's home. It is clearly for this basic reason that we have appeared to the French, since the Great War, to be ridiculously altruistic towards our late enemies. It has been said by a careful student of international affairs, when speaking of the American attitude towards European questions, that the Eastern States are some 3,000 miles, and the Western States some 5,000 miles, more altruistic towards ex-enemy powers than is France, and we are clearly in a somewhat similar situation. The consequence of this lack of real appreciation as to the meaning of Home Defence has in the past encouraged us, as a nation of shopkeepers, to look towards commerce protection and control of sea communications as the principal object of our armed forces in war. Commerce protection was our conception of Home Defence.

In order, however, to discuss intelligently the effect of the introduction of air power upon the question of Home Defence and commerce protection it is necessary briefly to survey the defence system which existed prior to the advent of the aeroplane when our imperial system was built up. The problem in the pre-1914 era was to provide security for our commerce, since it was recognised that the life of the Empire must cease if the sea communications which joined the scattered parts were severed. The question of invasion did not intrude as a first essential. So little indeed was the influence of sea power appreciated, in spite of writings of great students like Mahan, that the bogey of invasion during the Great War was sufficient to compel the retention of a large number of troops in the United Kingdom, where they performed no useful purpose whatsoever. The proper functioning of our maritime defensive organisation depended upon a paramount battle fleet, adequate ship building facilities in the United Kingdom and adequate Fleet bases and refuelling stations throughout the world. So long as this organisation was maintained unimpaired no hostile power

it. A.R.P. notices besmire the streets of almost every town in Europe. Historic parks and open spaces resemble battlefields with their trench systems, the ancient peaceful aspect of the countryside is made hideous with aerodrome buildings while its cloistered quiet is destroyed by the roar of engines ; rural amenities are disappearing one by one. The emphasis of our strategic thought is inclined to be placed now first on Home Defence and secondly upon the security of sea communications.

It may be stated categorically, indeed it has been so stated, that the foundation of our edifice of imperial defence is the maintenance of the security of the United Kingdom. It is recognised that our main military strength lies in the resources of man power, in the powers of endurance, and in the industrial capacity of the United Kingdom. It is also appreciated that with the advent of aircraft these fundamental bases of our power of national resistance can no longer shelter behind the steel fence of naval power and permit the slow, steady, and immense development of our national war effort to go on. They can be attacked from the first moment, and an umbrella of air security is now our most vital defence requirement.

Before going on to discuss how this umbrella is to be provided, it is important to recognise how closely connected are the problems of the security of the United Kingdom, so that reasonably normal life can continue, and the provision of those vast quantities of foodstuffs and raw materials that we require to be brought to us in ships from the four corners of the world. Efforts have lately been made to make us less dependent upon imported goods, but at the best they can be only a palliative to tide over the first few vital months. We can neither eat, nor manufacture and export the goods we must produce to pay for our food requirements, without the ability to use the sea.

This preliminary review enables us to define in quite simple terms the particular new factors that the development of the aeroplane has added to our problem of national security.

- (i) It has introduced the new factor of air invasion.
- (ii) Direct air attacks from shore bases upon ships at sea are now possible.
- (iii) Considerable assistance is available to our organisation for controlling sea communications by greatly extending the area of vision of cruising units, and the power to attack isolated raiders, surface or submerged, hundreds of miles away from the parent naval unit.

At first sight it looks as if it would be a simple matter to divide responsibility and organisation as between the factors which quite clearly affect ships and their operating organisation, and air invasion of the country as a whole. Closer examination, however, shows this to be false. To begin with the same bomber aircraft can attack any target at will. They may attack ships in narrow waters, shipping in docks, naval bases, centres of land transport, Army concentration areas, towns, factories, or aerodromes. From the operational point of view the sole criterion is adequate range and refuelling and

rearming facilities. The organisation for the offensive attack upon the hostile air organisation must, therefore, clearly be centrally controlled. The complementary organisation is close defence, consisting of A.R.P. organisation, guns, lights, balloons, observers and fighter aircraft. For similar reasons this also must be centrally controlled or else no sort of reasonable economy could be effected. There is clearly then some fundamental interdependence, but is it so fundamental that only one organisation is required to provide security in both directions? The principal difficulty is that in considering the protection of shipping one immediately begins to turn away from the United Kingdom and to pay attention to the ocean routes, the naval bases, the sources of supply and the air, and other threats that may be present. Here then is a distinction.

At home one central organisation seems clearly to be required to provide that umbrella of security without which we cannot live. To a considerable extent the same aircraft can act as the eyes and the teeth as well. It can co-operate with the Navy on one day to find a hidden enemy, with an Army on the next to provide protection or offensive power, and on the third it can bombard an enemy's factory organisation, centre of transportation, or an air base.

Out of range of these shores, however, the problem is different in urgency and degree and seems to require even further subdivision. First there is the question of the local protection of Dominions and Colonial territories. Each will have its separate home defence problem showing in small scale the principal characteristics of the Home Country in greater or lesser degree. Systems of inter-reinforcement by land, air, and sea will be features of the organisation, and a common doctrine and common equipment and ideas will mark them all. Secondly there is the question of co-operation with the Navy, not only in its war against the enemy naval power, the war of cover, but also in its far more exacting war of sweeping the sea free from all submarines, cruisers, and commerce and protecting our own commerce on the high seas. The main Fleet requires its quota of aircraft for reconnaissance, spotting and striking, and this is provided by Fleet carriers and aircraft embarked in the capital ships and cruisers, assisted by the operations of General Reconnaissance shore based aircraft. If the situation permits, indeed, assistance can also be rendered both by the offensive and defensive air units provided to produce the umbrella of air security now required in war wherever an air threat exists. The Fleet bases require this protection just as badly as other centres of national activity, including the manufacturing capacity which maintains the Fleet.

It is just this problem of providing the necessary air security for our naval bases and refuelling organisation which exemplifies most clearly the effect of aircraft on the old problem. For a Fleet to provide cover it must be based within reasonable distance of the enemy. It must be close enough to the enemy's base to prevent the emergence of the enemy to dispute control or to attack trade without his being brought to action. With the existing and projected speeds of Fleets remaining at about 30 knots a base 400 miles away from

the port its Fleet is watching is already almost too remote. Aircraft in service to-day have a greater striking range than this. Local air security has, therefore, to be provided on the spot and to be effective it may have to reflect all or nearly all of the features of the major air defence organisation required for the United Kingdom. It must be a reasonably balanced organisation. It will obviously require reconnaissance and striking aircraft. It may require a fighter element. It will almost certainly require guns, lights and listening devices, and all the impedimenta of an A.R.P. organisation. In certain circumstances also balloons may even form an element.

The provision of these components is not only very expensive, but considerable areas are required for their effective deployment. The aircraft for instance require aerodromes. One alone may be enough if the air threat is very small, but generally speaking not only is depth necessary for warning of attack to be provided, but also the vulnerable ground installations required by air forces must rely for security largely on dispersion. It is at once obvious under what disadvantages the existing naval bases of Gibraltar, Malta, and Hong Kong now suffer. The small self-contained and sea girt island as a site for a secure naval base now has few advocates. Sites for aerodromes and enough dispersion and depth for defence are now essential requirements.

Granted, however, that the main Fleet may be reasonably securely based and that secure bases for the forces exercising control can also be maintained, it is necessary to consider the operation of the cruiser forces in searching for and sinking every raider on the high seas, and of the local forces in their war against the submarine. The first assistance that aircraft can provide is that of reconnaissance. They can search large areas with ease; indeed in favourable conditions of weather they can make good more sea area in a couple of hours than the parent ship can in a couple of days. Thus they can find a raider far out of range of the ships with which they are co-operating, and provide an opportunity, if striking air forces are available, of attacking and crippling her, if not of sinking her, long before the surface forces could get within range.

Such an air component can either be provided in the form of catapult seaplanes embarked in cruisers or armed merchant vessels, or in the form of smaller carriers containing a balanced striking and reconnaissance force. These potentialities of aircraft are of great value to a power which has employed war on trade as one of the most powerful of its means of bringing pressure to bear upon an enemy nation. Not only does it enable enemy commercial shipping to be swept off the seas much more quickly than of old, but it also permits considerable economy of force in searching for and sinking enemy war vessels and raiders at large upon the high seas.

To turn to the operations of the local forces in their war against the submarine we find that the aircraft's powers of rapid search and striking are again in great demand. Aircraft can locate submarines and direct against them high speed light forces to destroy them by depth charges. They can escort convoys and thus add to the anti-submarine strength of the surface escorting force. Finally,

aircraft by their power of direct attack upon submarine bases within range can considerably reduce the effectiveness of the bases even if they may not be able absolutely to deny their use.

From this brief review of this complicated problem it is apparent that the influence of air power has reoriented our views on home defence. The protection of the United Kingdom is the corner stone of our Imperial defensive system. It is now subject to an increasing scale of air invasion and our most pressing need is to produce an umbrella of air security beneath which the national ability to live, work, and develop the war potential can go on. Only second to this is the need to protect the flow of sea-borne trade from the four corners of the globe, which is a necessity for our national life and activities. Both ability to live and work and continuity of supply are essential ingredients in national security, and if ability to live is the more important in terms of time in the initial stages, ability to continue to operate and to extend industrial output is a vital necessity for the survival of the Empire. Home Defence against air attack can be considered as a self-contained problem at the centre calling for a central directing and co-ordinating authority. The air defence forces required will comprise both striking and security elements and will provide for the necessary co-operation with land and sea forces. Commerce protection out of range of the Home Defence forces is another problem, calling for a different organisation, more elastic systems of control. Defence of bases and overseas territories partakes closely of the character of Home Defence as such, most of the air defence element will be represented, and central co-ordination of the forces will be required. The inter-relation between the particular activities of Home Defence and the particular activities of commerce protection, however, is much more marked than in the United Kingdom. The two portions of national security Home Defence and commerce protection may be likened to the heart and the stomach. If the heart is struck life ceases abruptly ; if the stomach is not filled life slowly drains away. A comprehensive air shield is now a necessary part of our national equipment and this shield is now in the process of being forged.

“ SECURUS.”

CHAPTER XIV.

THE INTERDEPENDENCE OF HOME DEFENCE AND TRADE DEFENCE.

For some years past the development in the range and offensive power of aircraft has increased their ability to intervene in operations which were formerly the exclusive province either of armies or navies. Their incursion has created a host of problems, not only as to how aircraft can supplement the other Services, but as to whether, and to what extent, they can supplant them. The heavy cost of armaments has made the latter important on the grounds of conserving financial strength, and thus an urgent aspect of co-ordination is the consideration of what functions the aircraft can discharge with equal efficiency, and less cost, than the older Services. In the train of these problems there follow the more detailed ones of co-ordinating the command of various arms of the Services, problems of peculiar difficulty owing to the special qualities and defects of aircraft and the wide areas over which the British Empire may have simultaneous military and naval commitments.

At first sight the aircraft, which is primarily an offensive weapon, may seem ill adapted to the needs of a Power without territorial ambitions, whose grand strategy will generally be defensive ; and it is one of the misfortunes of the British Empire that the continual reiteration of the word " Defence " tends to overshadow the study of the use of offensive weapons on the background of a defensive grand strategy. But no war can be won without a vigorous use of the offensive, and the role of air forces in these circumstances is at once one of the most interesting of current problems, and one most empty of data based on war experience. The remarkable progress of aeronautical science has not been accompanied by a comparable reduction of the aircraft's basic military weaknesses ; its continuity of effort is still low, involving large numbers and high cost ; it cannot remain independent of its base for the periods, or at the distances, possible to naval forces ; and the mobility of these bases and their aerodromes is not of an order sufficient to permit large air forces to move and operate in the Imperial sense with the ubiquity, the speed, or the range of naval forces. These factors are of special consequence to a Power whose interests are vulnerable over such wide areas as the British Empire, for a relatively static war in Western Europe may well be accompanied by attacks on distant possessions and trade throughout the seven seas, and it is thus evident that air forces have a military value directly related to the strategic mobility required of them. In these circumstances the problem of co-ordinating the efforts

of the armed forces becomes an extremely complex one in which the relative values of ships and aircraft in a particular function have a continually varying relationship, depending on the distance of the aircraft's base from the area of operations.

Two examples may serve to make this point clear. In the English Channel the defence of seaborne trade is a function in which air forces may play a considerable part ; on the other hand a commerce raider operating in the Indian Ocean will often be beyond their reach. Between these two extremes lie areas which aircraft can barely reach, and in which they may remain for a matter of hours only, as compared with days in the case of naval forces. To maintain each aircraft in such an area would require such large numbers that the cost would be prohibitive in comparison with the cost of ships. In the study of Trade Defence, with due regard to the conservation of financial strength, there is thus a nebulous region where the determination of relative responsibility is extremely difficult.

HOME DEFENCE.

Unfortunately the problem does not end here, for Home Defence of the United Kingdom absorbs a large proportion of the British Air Force whose duties may include not only independent operations on the Continent, but also Trade Defence extending from its more parochial forms round the shores of these Islands to the intangible limits mentioned above, beyond which sea power alone holds sway. Within this wide field of effort there are many conflicting claims on available air forces ; claims which require consideration because every aircraft cannot fulfil every duty. The versatility of air forces is not complete because attempts to combine, for example, the qualities of a fighter with those of a long-range bomber, would result in failure. The Home Defence requirements which therefore predominate in the Metropolitan air forces entail a degree of specialisation ; yet these forces comprising as they do, fighting, bombing, and reconnaissance aircraft are in principle capable of diversion from land operations to operations connected with Trade Defence in the areas referred to previously. This attribute of versatility appears attractive as a means of economising in other services ; yet it is at this point that the more formidable difficulties of co-ordination become apparent.

In the first place there is no operation of war in which air forces are independent of other services, whether it is the defence of London from air attack, or the protection of coastal shipping, docks, and harbours. This point tends to be obscured in Western Europe because England herself is the aircraft's base, whose protection and supply are necessary for reasons other than that of enabling aircraft to operate within range of Continental objectives. In making calculations for defensive requirements, the other Services must therefore base their plans on some assurance as to the part to be assumed by air forces, if economy is to be achieved by reducing their building and supply requirements. Yet if the Home Defence

air forces are to employ the power of versatility the foundations on which the other services base their calculations are undermined.

If we take as an example the air forces designated to assist in the defence of seaborne trade in the English Channel, a reduction of naval vessels employed in this area will hardly be possible if the air forces are liable to be withdrawn to support a Continental ally or Expeditionary Force, since enemy operations against our trade are unlikely to cease at this moment. A similar problem will face a military ally or the Commander of a British Expeditionary Force, who may have to forego his chosen moment for an important operation if the air forces on which he must largely rely are at that moment employed elsewhere. As a part of this general problem there is the difficulty of training a personnel, whose war casualty rates are high, in the specialised requirements of co-operation with the other Services; it could hardly be described as economical, for instance, for naval forces to expend large quantities of oil fuel in training to take part in naval operations airmen who, in war, would be largely employed on Continental bombing operations in which losses might well be high. Broadly speaking, therefore, if air forces are regarded as capable of diversion between the many functions required of them in a Western Europe war, they cannot be given the prime responsibility for operations in which they are temporary participants; nor can the other Services base their plans to reduce their costs on any reliable assumptions.

One alternative to this conclusion would be the separation of the available air forces into groups permanently allotted to a specific function, trained for it, and supplied with aircraft built for the purpose. Such an arrangement might result in a Naval Group, an Army Group, a Bomber Group, and a Fighter Group for Home Defence. This plan might permit economies in the plans of other Services by guaranteeing in some measure the air assistance available to each; but it might have serious disintegrating effects on the Air Force, and lessen the flexibility and versatility which are, in an offensive weapon, qualities so important to the British Commonwealth. A further argument arises from the limited assistance which air forces can in fact give in such matters as Trade Defence. The aircraft cannot sweep mines; it cannot protect trade against surface attack by night; it cannot detect commerce raiders disguised as merchantmen; and such functions as convoy escort are a passive use of an offensive weapon whose value in such duties may not justify the cost and effort involved by its diversion from more positive offensive functions elsewhere.

If we thus reject the principle of specialisation in favour of a versatile force capable of diversion from duty to duty, and area to area, at a reasonable though limited speed, it becomes possible to consider Air Power as a powerful superstructure on existing Services, by whose aid a particular operation may be greatly accelerated and strengthened, but whose withdrawal will not cause a breakdown of essential Services. It is true that this method is an expensive one since it will not permit drastic economies in Services where aircraft are suitable to replace other weapons. It is however, among the

most interesting of the various alternative solutions of the problems of co-ordination.

TRADE DEFENCE.

The direct participation of aircraft in the control of sea communications is limited to the areas within their reach. A relatively small number of aircraft, by being embarked in ships, achieve mobility on the scale of naval forces, but the greater number are limited to the mobility of their bases, or to their ability to fly between bases established at intervals over the areas of importance to this country. It is of interest to note that the existing Air Route to the East is a hostage, throughout its length, to the goodwill of various foreign Powers great and small, and lies for the most part far from the ocean trade routes in whose defence aircraft might take part. It is to be hoped that when the ranges of aircraft permit, a more southerly route through British Africa, and the islands of the Indian Ocean, may be developed ; where the succeeding bases in the chain are inaccessible to enemy land forces, or shore-based aircraft ; where their supply, protection, and reinforcement can be based on our naval supremacy ; and where aircraft operating from them and passing between them may assist in Trade Defence. Nevertheless, the open oceans which furnish the commerce raider with his best opportunities are for the most part inaccessible to shore-based aircraft, and the danger of hostile air action is limited to such areas as the Red Sea, through which trade must pass and round which it cannot conveniently be diverted to avoid a particular hostile air base. Here the functions of aircraft in Trade Defence may be summarised as Direct and Indirect.

Those functions may be described as direct in which aircraft, operating over the sea in concert with naval forces, play, with them, a direct part in exercising the control of sea communications. Their duties here would include search, patrol, and offensive action against enemy surface and submarine forces. This type of employment would be distinct from the defence of trade against hostile air attack, and the aircraft taking part in it would co-operate primarily with our naval forces.

Before proceeding further it is well to recognise the common fallacy that aircraft are suitable for independent action against merchant shipping. No Power can adopt such a policy unless it is prepared to disregard neutral opinion, for the reason that aircraft cannot establish the nationality of shipping owing to their inability to board and search them. The simplest disguise, and the use of neutral colours by belligerent shipping, will expose such a Power to the consequences of attack on neutral as well as enemy shipping. Such a possibility of its adoption cannot, however, be disregarded.

The indirect function may be said to consist of "holding the ring" for the forces employed on the direct defence of trade, against hostile air forces operating from bases established near such focal areas as, for instance, the Red Sea.

Taking the case of a hostile air base established within reach of a Trade Route in confined waters, it is clear that the use of defensive

air patrols to accompany shipping in the danger zone must be ruled out as an extravagant and passive use of aircraft ; since to be effective these patrols must be powerful enough to meet the largest force which an enemy might despatch at a moment chosen by himself. Since the aircraft is not by itself a defensive weapon, the solution of this problem is the destruction of the enemy air base itself, and this course of action may well lead to a combined operation involving all three Services. Moreover, if the enemy's main territory is within easy reach of the disputed base, such a policy might involve a major operation. Thus the employment of air forces on their indirect functions in Trade Defence may have far-reaching consequences—may, indeed, influence the whole course and conduct of a war.

VERSATILITY.

The above problems show the value of mobility to the British Air Forces, and the immense importance of an organisation sufficiently flexible to permit a rapid redistribution of air strength from the Home Defence to Trade Defence, from Trade Defence to Army Co-operation, or to any other requirements which may arise as a consequence of our far-flung and widely varied commitments. In every case, the inability of the aircraft to replace other Services strengthens the arguments in favour of the retention of a high proportion of available aircraft under the control of a single Department of State responsible for the application of Air Power to strengthen and supplement, rather than to replace, the other Services.

COMMAND.

Within this general principle there arises the secondary problem of co-ordination in respect of command. It is an old maxim that "Committees do not make war," and we have much past experience to show that operations involving more than one Service may be gravely hampered if the final decisions and responsibility for them are not vested in one man. Any system of divided or joint responsibility is fatal to the speed and resolution necessary in the conduct of operations in war, and the inclination turns to the placing of supreme responsibility on the Service which occupies the predominant part in any particular operation. If this be accepted, it is evident that the conduct of distant and relatively self-contained operations involving two or more Services is a more simple matter than the conduct of many simultaneous operations of varying kinds within the narrow confines of a Western Europe war ; for within these limits aircraft possess the mobility to take part in many different duties without reactions on other Services in respect of moving their bases.

In such a war the command of the forces taking part in such duties as Home Defence on the one hand, and Trade Defence on the other, does indeed appear to be beyond the power of a single executive, for such a man would be faced by problems of astronomical proportions in such an event as the sortie of powerful enemy naval

forces simultaneously with heavy air attacks on objectives such as London. A rapid diversion of air forces between various duties in such an event, even on the assumption that they constituted a super-structure on, rather than the foundation of, the forces engaged in each, could not fail to result in confusion and uncertainty in the formulation of plans.

It is necessary, therefore, to consider the conception of the direct and indirect participation of aircraft in such functions as Home and Trade Defence in a Western European war, regarding such aircraft as are allotted to the direct functions of each as having a greater permanence of attachment to other Services than those engaged in the indirect functions aimed at the same end. In this case it would be possible to regard as a direct function of Trade Defence such duties as reconnaissance against enemy naval forces and anti-submarine operations; while classifying as an indirect function such operations as attacks on enemy naval bases.

On such assumptions as the foregoing the problems of command would seem capable of solution on a basis which would satisfy to some extent the conflicting claims of versatility on the one hand, and a profitable use of aircraft in replacement of other Services, on the other. The air forces exercising what are for convenience described as the direct functions, would be under the command of the Service with whom they co-operated or vice versa, on the principle of the predominant Service in a given operation; while the air forces exercising the indirect functions would for the most part operate under an independent central command whose diversions between various duties would not immediately affect the plans of the other Services. Within the category of indirect functions in a Western European war would lie such duties as bombing operations against Continental objectives beyond the reach of armies or navies.

There remains the problem of the detailed co-ordination between land and sea forces, and the aircraft exercising the direct functions in which they may be respectively employed; and here there are many questions which cannot be finally solved without war experience. To take only the question of Trade Defence, on what conditions of permanence should air forces exercising direct functions be allotted to a Naval Commander-in-Chief? How is the latter when at sea to exercise command over such aircraft operating with him from shore bases? How are these air forces to be trained for their duties in peace without a degree of specialisation inimical to the conception of a single Air Service? Of these questions two are of outstanding interest: first, that of command, the second, that of aircraft types.

With regard to command, the difficulties of contact between the Air and Naval Commanders are of interest in cases where one or other is responsible for the conduct of a combined operation such as Trade Defence, in the direct sense of affording protection against enemy surface or submarine forces. The speeds of modern ships and aircraft require a system of command capable of equal speeds of decision, and this is difficult of fulfilment if the Commander of the Air Forces ashore is out of touch with the Naval Commander at sea.

With regard to aircraft types, the flying-boat does not possess characteristics suitable for its employment over as wide a field of duties as the landplane, and for coastal use the landplane is probably superior. The flying-boat has, however, the quality of relative independence of prepared bases, and it is thus highly suitable for those areas, such as the Indian Ocean, which are inaccessible to landplanes owing to the non-existence of sites for aerodromes. In these areas the flying-boat can be of great value in exercising the direct functions of Trade Defence, but its construction in adequate numbers for these duties involves expenditure on a specialised type incompatible with the conception of an Air Force capable of a variety of duties.

The true place which should be occupied by aircraft in their relations with the older Services is, therefore, difficult to decide without trial by war of the adjustments necessary in those relations in respect of co-ordination of command, relative value for money, and suitability for the many different areas in which armed forces may be required. Wars are won by policy rather than power in the sense that armed strength must act in concert with other factors. Nevertheless, power itself is expressed to-day in terms of the degree of political success achieved per pound sterling spent on its military components, and the aircraft, no less than other weapons, must provide value commensurate with its high cost, in finding its proper place in the military establishment. In seeking solutions to these difficult problems, the urgent needs and conditions of Home Defence, always perforce present to the mind, must not be allowed to obscure the very different needs and conditions of far distant seas, in reality no less urgent to those who hold, in Kipling's words, "dominion over palm and pine."

"CLINANDROS."

CHAPTER XV.

MARINE AIRCRAFT DEVELOPMENT.

DURING the last few years interest in the development of large flying-boats has been intense. Apart from the improved performance—speed, range, and load—the most impressive feature of the latest types, military and commercial, is the greatly increased room and comfort provided in their spacious hulls. Comfortable conditions for the crews and passengers have been one of the principal features in the design of the new flying-boats. Service requirements necessitate crews living on board for long periods, and this requirement, unless the efficiency of the crew is to be impaired, necessitates greater living space, the provision of sleeping bunks, cooking facilities, and other conveniences.

The provision of these reasonable comforts is also rendered necessary owing to the greatly increased range of flight and navigational difficulties over sea. Facilities for navigation required by flying-boats employed on combatant duties are considerably greater than those in commercial employment. The latter consists of making passages from one point to another and has, or should have, wireless directional aid in addition, and ultimately a landfall by which to check the navigation at the really important stage. In the case of flying-boats combatant duties, however, involving long cruises, often necessitate flying on varying courses and with little opportunity of checking the accuracy of navigation by eye; and the important moment, from the navigational point of view, is not the end of the voyage but some indeterminate point in the course of it, when, for example, an observation of an enemy is made. It is thus even more essential in a military flying-boat to make very full provision in the design stage for the requirements and comfort of the navigator so that he may be able at all times to work at maximum efficiency.

Fortunately this presents no difficulty. Progress in aerodynamic design and in the design of engine units of greatly increased power during the past few years has opened up an avenue for the development in the size of flying-boats as would have been deemed impossible ten years ago. Certain theories which placed a low limit on the economical size of heavier-than-air craft have proved fallacious, and it is well for the future of aircraft that it is so. The need was for engines of about 1,500 to 2,000 h.p. to simplify the design of marine aircraft which might require at least a total of 10,000 h.p. Giant marine aircraft capable of carrying very heavy loads over long distances are now assured of a great future in the overseas commerce

of the world, where quickness of communication is the important factor. Recent types placed in service on the overseas commercial air routes, principally by British and American operators, are easily adapted for military purposes, an example of which has been the Short Sunderland, the military offspring of the Imperial Airways Empire flying-boat.

In an address given in June, 1938, Mr. Sikorsky, the well-known American designer, gave the following illuminating forecast of the future of the flying-boat :—

“ I do not see any limitations in the size of the flying-boat, and it is reasonable to predict that even 1,000-ton boats will be built within a decade. Even much larger boats could theoretically be built. The limitations will not come from engineering or designing but from traffic requirements. A steamship carrying 2,500 passengers and making one Atlantic crossing in a week could be replaced by five flying-boats with a capacity of 100 passengers each. They could handle equivalent traffic within the week. To serve their purpose, however, the flying-boats would have to make frequent departures. Boats of 100 to 1,000 tons with luxurious accommodation including dining-room, dance hall, etc., can be built within the next five or six years. This development of the flying-boat is the field in which aviation will perform its most significant service to humanity in the near future.

“ No other type of aircraft, except perhaps the dirigible, gains so much with increase of size as does the flying-boat. Therefore, a good flying-boat must be large. It comes into its own with size. At 5 to 10 gross tons the landplane is superior. From 50 to 100 tons the flying-boat becomes superior. It is faster, has better take off, greater ceiling and greater economy of operation.”

But whilst this increase in size may undoubtedly bring with it many commercial advantages, what, if any, are the advantages from the military aspect? Before we can answer this question it is necessary to refer to the rôle of the flying-boat and its limitations as a military weapon, more especially in naval warfare. Briefly stated the principal functions of aircraft in naval warfare are :—

- (a) Offensive action against hostile aircraft and protection of warships from air attack.
- (b) Reconnaissance.
- (c) Offensive action against enemy naval bases and warships in harbour.
- (d) Offensive action against enemy warships at sea.

The only sphere of action in which the flying-boat can be said to be equal or superior to land or carrier-borne aircraft is reconnaissance. The length and breadth of our sea communications alone demand two essential qualities for this rôle; they are :—

- (i) Endurance.
- (ii) Mobility.

These, and the navigational factors referred to earlier in this chapter, in turn demand a flying-boat of fairly large size, and it would seem that this has already been achieved by the latest “ Empire ” class of commercial flying-boat of which the Sunderland is the military offspring.

It is pertinent here to remark upon the fuelling experiments which this year will be put to the practical test in connection with the forthcoming flights over the North Atlantic route. The new



THE BOEING FLYING BOAT DESIGN.



THE SIKORSKY FLYING BOAT DESIGN.
(By courtesy of *Shell Aviation News*.)

Imperial long-range flying-boats which will be used on this route—the Cabot, Caribou, Connemara, and Clyde—will have the distinction of being the first fleet of commercial air-liners in the world to be equipped for regular fuelling while in flight. This is one of the methods, and, it would seem, the most promising of all, of increasing the range and load-carrying capacity of commercial and military aircraft. Three specially equipped air tankers will be employed in the fuelling operations and, when this season's ocean-flying begins, it is intended that two of them shall be stationed on the other side of the Atlantic at Botwood, Newfoundland, the third being located at the new air-base which the Eire authorities have established at the mouth of the river Shannon.

Mid-air fuelling is carried out as follows. After a flying-boat has ascended, an air tanker manoeuvres into position above it, the necessary fuel pipe being passed down to a member of the flying-boat's crew stationed in the tail. The pipe is drawn into the flying-boat and attached to the tank which is to be filled. The required amount of petrol is then passed down into the flying-boat; the air tanker—while fuelling operations are in progress—maintaining its position above the flying-boat. This is one of the three means of overcoming take-off difficulties, the other two being catapults and composite aircraft. Catapulting is used for land and ship-borne aircraft. The upper component of the composite aircraft must be relatively small; to make it sufficiently large would necessitate a lower component too large to be practicable. So far composite aircraft have not been used for military purposes, there being only one composite unit in existence. Of the three methods, therefore, flight refuelling has neither the disadvantages nor the complexity of the composite and is the more likely to become a prominent means of allowing flight at very high wing loadings. Its use for military purposes, however, does not appear to be of any great consequence.

But the development and operation of large commercial flying-boats are quite obviously of considerable potential value in war. The aircraft, personnel, and organisation of our Imperial air mercantile marine will be available at a moment's notice to turn over to reconnaissance and other duties in connection with the defence of our sea communications. Having these commercial resources at our command for adaptation for military use in war allows us to concentrate our military effort in peace to providing those weapons—types of aircraft—which are vital to our offensive strength in the air.

GERMANY.

In contradiction to the present general trend in Great Britain and the U.S.A., Herr Dornier has clung to the design involving a high-wing carried on a strutted superstructure above the hull in his ocean-going three-engined high-wing monoplane flying-boat. Though looking considerably less clean than a wing mounted directly upon the hull, this arrangement, judging by the performance figures, does not appear to cause any loss of performance.

The latest Dornier (Do. 26), powered with four Junkers heavy

oil engines in two tandem pairs has been developed as a mail carrier for the North Atlantic air traffic and is able to fly the long stretch Lisbon—New York non-stop with a pay load of 900 Kg. The Do. 26 is designed for catapult work and incorporates many unusual features. For example, lateral sponsons, characteristic of Dornier boats, have been replaced by retractable wing floats. Top speed is 208 m.p.h. and maximum cruising speed 192 m.p.h.; the cruising radius is 5,600 miles. When launched by catapult she could carry four passengers and a ton of mails non-stop from Lisbon—New York. The chief characteristics of these two Dornier boats and the Short Empire and Sunderland boats are given in the Table below for comparison.

PRINCIPAL CHARACTERISTICS OF SOME OF LATEST FLYING BOATS.

Type.	Span.	Length.	Wing Area.	No. of En- gines.	Total h.p.	Gross Weight, lb.	Max. Speed, m.p.h.	Range, Miles.
Dornier Do. 24	88 ft. 7½ in.	72 ft.	1,153 sq. ft.	3	2,100– 2,700	29,760	195– 210 *	2,175
Dornier Do. 26	98 ft. 5 in.	80 ft. 4 in.	1,292 sq. ft.	4	2,400	44,092†	208	5,000
Short Empire	114 ft.	88 ft.	1,500 sq. ft.	4	3,160	40,500	200	760
Short Sunder- land	Do.	Do.	Do.	Do.	3,400	45,700 49,870	210	normal 1,670 overload 2,500

UNITED STATES.

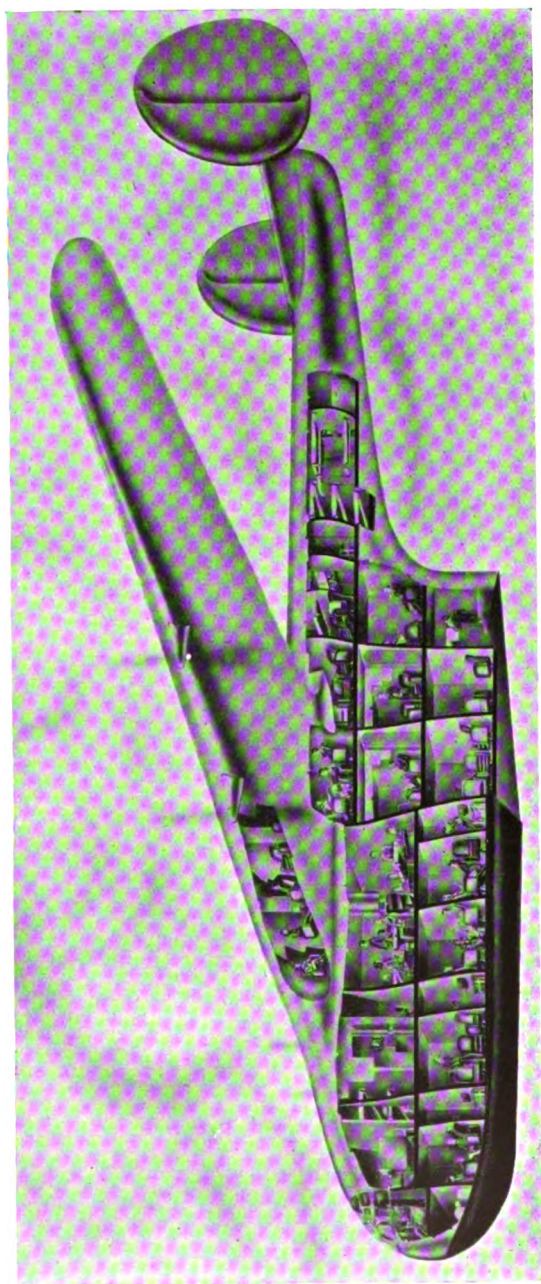
The trend of design in America has recently been shown (publicised) by the designs submitted by certain makers in response to a circular letter addressed to eight manufacturers by Pan-American Airways inviting them to submit proposals for the design and construction of a fleet capable of carrying 100 passengers for a distance of 5,000 miles at a maximum speed of 300 miles an hour and with a cruising speed of not less than 200 miles an hour at sea-level. Among the designs submitted were three flying-boats by the Boeing, Consolidated and Sikorsky Companies.

BOEING AIRCRAFT COMPANY.

The design submitted by the Boeing company consists of a flying-boat fitted with six engines housed in the wings and accessible during flight. The engines drive fully-feathering, constant-speed airscrews through crankshaft extensions. The tail assembly consists of the conventional single fin and rudder, although the recent change to the triple arrangement made in the Boeing 314, to which the new design bears a strong family resemblance, might suggest that a

* According to power unit.

† Catapult start.



THE "CONSOLIDATED" FLYING BOAT DESIGN.
(By courtesy of *Shell Aviation News*.)

similar change will be made in the 100-passenger flying-boat if the design is accepted.

CONSOLIDATED AIRCRAFT CORPORATION.

Consolidated have designed a flying-boat fitted with four engines which are to be liquid-cooled and supercharged and rated at 2,150 horse-power each at sea-level. These are to be mounted in the leading edge of the wing and will drive tractor airscrews through extensions to the crankshafts. Each of the four engines is to be accessible for servicing and minor repairs during flight. Consolidated claim that the reduction in the number of engines from six to four will result in increased efficiency. The design envisages an aircraft with three decks, while 36 of the 100 passengers will be housed in the wing at the expense of a slight thickening and a resultant small increase in the drag.

In this arrangement the engineers were faced with the problem of dividing the cabins by the wing bulkheads, but the difficulty was overcome by putting the main bulkheads at the sides of each compartment and using auxiliary arched ribs between, which do not affect the head room. The development of the wing for this purpose has proved to have been another advantage in that the covering used to take normal wing bending loads would be able without further reinforcement to withstand the pressure loads incurred in flight in the stratosphere. The remaining 64 passengers are accommodated in cabins for either 2 or 4 in the ship's hull. The dining-room is situated on the middle deck and enables 18 persons to sit down at one time. A commodious lounge is provided on the top deck. Quarters for 7 of the crew are provided in the after portion of the flying-boat, while there is an additional cabin for 2 of the crew in the forward portion. Three mail and freight compartments are envisaged, one in the nose of the aircraft beneath the pilot's compartment, another in the leading edge directly over the galley, and the third in the tail. The tail is to be of the normal twin fin and rudder type. Occupying the whole of the forward part of the upper deck are the operating quarters for a pilot, second pilot, flight engineer, radio operator, and navigator. Besides these 5, 11 others can be carried.

SIKORSKY AIRCRAFT.

Similar to the Boeing proposal, the Sikorsky design depicts a high-wing monoplane flying-boat with six engines driving fully-feathering, constant-speed airscrews by means of shaft extensions. The hulls of both aircraft are similar, although the Sikorsky design suggests a boat hull to a greater extent than the Boeing design. In the tail assembly the two aircraft differ, for the Sikorsky design has a dual fin and rudder.

THE SEVERSKY AIRCRAFT CORPORATION.

The Seversky Aircraft Corporation was not included among the eight manufacturers to whom Pan-American Airways originally

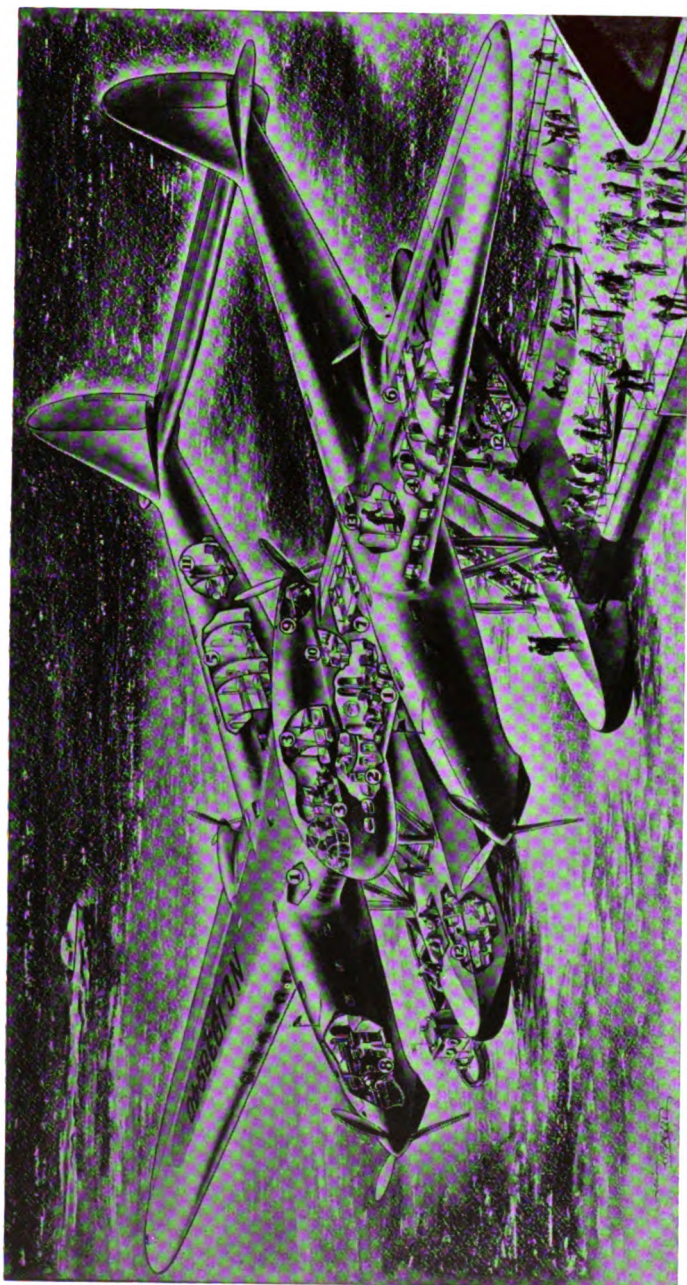
wrote. They were, however, given permission to submit a design. The Seversky Super-Clipper has been designed to carry a payload of 48,000 pounds for a range of 5,000 miles at a minimum cruising speed of 250 miles an hour. It is to carry 120 passengers with all the comforts found in a modern ocean liner. The aircraft is virtually a flying wing and has particularly spacious accommodation for state rooms. A dining-room, a cocktail bar, and observation and promenade decks will accommodate 60 people comfortably. A galley serves the dining-room which can seat 50 persons at a time. The interior of the Super-Clipper is supercharged to maintain an air pressure equivalent to that at 8,000 feet when the aircraft is flying at 20,000 feet. A crew of 16 are required to operate the aircraft.

The wing has a span of 250 feet and there are two large fuselages or "outriggers" which house retractable landing pontoons and support the tail surfaces. It is claimed that this form provides all the advantages of a flying-boat and it gives the higher performance and efficiency of land aircraft. The unusual width between the two pontoons will make for great stability on the water, while the hydraulic mechanism used to raise and lower them will also perform the functions of shock absorbers. There are eight liquid-cooled engines each rated at 2,000 horse-power and developing 2,800 horse-power for take-off. Two engines coupled to a single airscrew will be placed at the forward end of each of the two fuselage structures and a third pair to the rear of the central bulge in the wing, which contains the control rooms. Two single-power units will be placed along the trailing edge of the wing outboard of the fuselages. All the engines will be housed in large nacelles capable of accommodating two mechanics. Like the fuselage, these will be supercharged and it will be possible to service and repair engines in flight. The design calls for the use of shot-welded stainless steel throughout the structure.

CONCLUSION.

The year 1939 should thus reveal another great forward stride in the development of marine aircraft, and coupled with the inauguration of experimental trans-Atlantic air services should further enhance the reputation of the flying-boat. We are, however, unlikely, at least in the near future, to see any spectacular developments on the military side, but the latent possibilities of the flying boat as an efficient aerial platform for mounting the larger calibre guns must not be overlooked.

C. G. BURGE.



THE SEVERSKY "SUPER CLIPPER" DESIGN.
(By courtesy of *Shell Aviation News*.)

CHAPTER XVI.

THE TRANS-ATLANTIC AIR SERVICE.

EXPERIMENTAL FLIGHTS ACROSS THE NORTH ATLANTIC DURING 1938.

IN Brassey's Naval Annual for 1938, the progress of the British and American flights across the North Atlantic during 1937 were described. The British flights were made by the two flying-boats Caledonia and Cambria, and the American flights by the flying-boat Clipper III. During the winter of 1937 these three aircraft reverted to their normal duties in their respective fleets, and were not available for trans-Atlantic flights during 1938. In the course of this reversion the Caledonia and the Cambria were equipped with passenger accommodation, had their fuel tankage reduced, and took their places in the flying-boat fleet which operates Imperial Airways' services on the African and Australian routes.

It was expected that British and foreign experimental flights in 1938 would be made with new aircraft. Unfortunately these expectations were not fulfilled. All but two of the new aircraft intended for the flights were delayed for one reason and another, and failed to arrive at the starting-post. This delay in the production of new types was not confined to the British plan, but applied equally to the American and French programmes. For their experimental flights in 1938 the Germans used the aircraft they had used in 1937, and in addition made flights with new aircraft.

The two new aircraft that were delivered in time to be used this year were British and German respectively, and both made outstanding contributions to North Atlantic history. The British aircraft Mercury (the upper component of the Mayo Composite aircraft) made the first non-stop flight from Ireland to Montreal and at the same time the first Atlantic crossing carrying a commercial load. The Mercury also made the fastest crossing in the western direction. The German aircraft, the Focke-Wulf Condor, made the first non-stop flight from Germany to the United States and also returned non-stop to Germany.

The Germans made most Atlantic crossings during 1938—twenty-eight in all; this is considerably more than the British programme, which, through a variety of causes, was cancelled after the first two crossings. The Americans made no Atlantic crossings during 1938, and the French one in each direction.

The British flights were concentrated upon the direct route *via* Ireland and Canada. The German programme was concentrated on the southern routes with a catapult ship stationed at the Azores and another at New York. The French also used the southern route,

although they had plans to use the direct route also, and in fact sent one of their aircraft to the Shannon for a few days.

The British flights in 1938 were made by Imperial Airways, the joint operating company for the North Atlantic service not yet having been formed. This joint operating company is to be formed by three air transport companies nominated respectively by the Government of the United Kingdom, the Government of Eire, and the Government of Canada; the three nominated for this purpose are—Imperial Airways, Aer Lingus Teoranta, and Trans-Canada Air Lines, respectively.

THE PROGRAMME OF BRITISH EXPERIMENTAL FLIGHTS FOR 1938.

Although the programme is a matter of rather academic interest because it was not carried out, it may be interesting to record what was intended. The programme was given in the House of Commons by the Under Secretary of State for Air on July 20, and read as follows :—

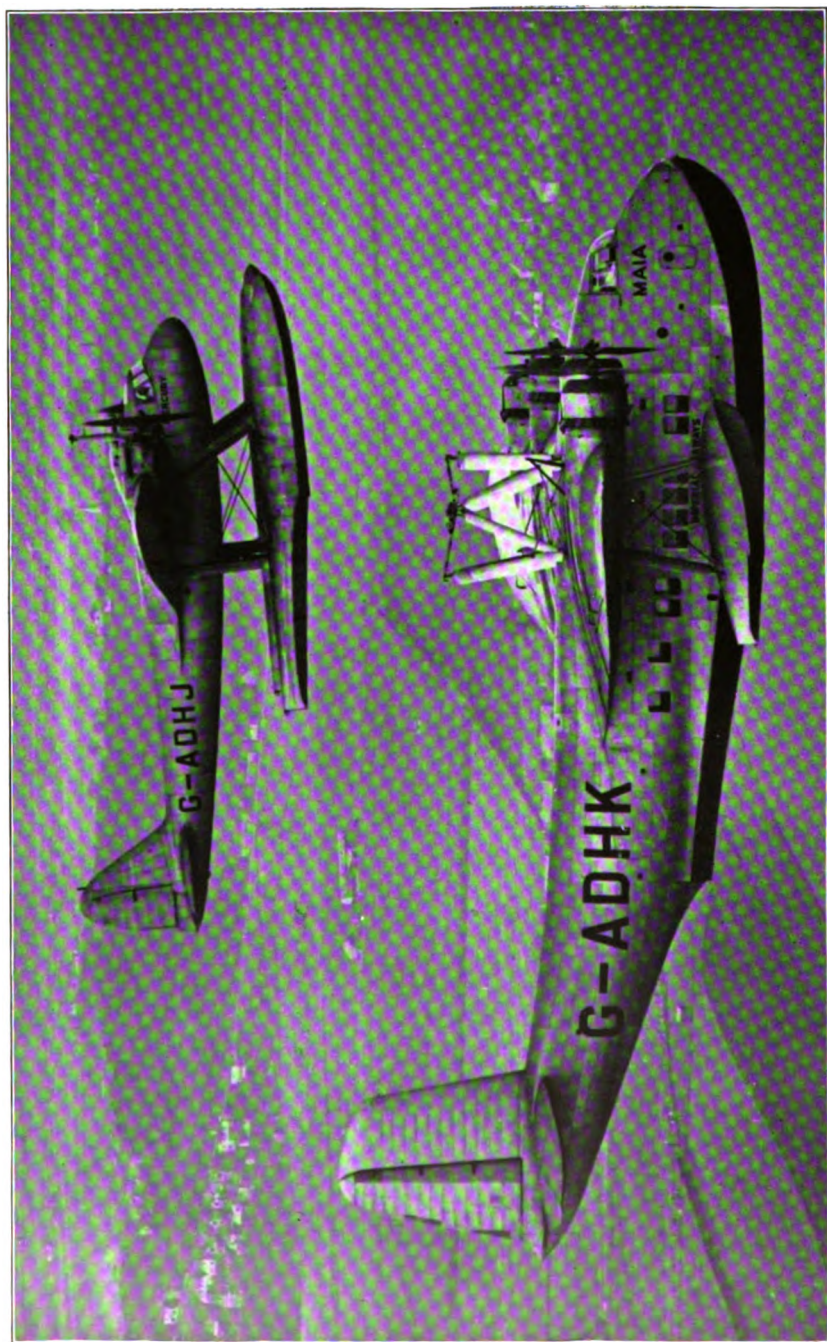
(1) July	15-20	Mercury	Southampton, Foynes, Botwood, Montreal, New York.
(2) „	21-28	Mercury	New York, Montreal, Botwood, Azores, Lisbon, Southampton.
(3) Aug.	15-20	Mercury	Southampton, Foynes, Botwood, Montreal, New York.
(4) „	21-28	Mercury	New York, Montreal, Botwood, Azores, Lisbon, Southampton.
(5) Sept.	1-10	Albatross No. 1.	Hatfield, Collinstown (Dublin), Hatties Camp (Newfoundland), Montreal, New York.
(6) „	11-16	Albatross No. 1.	New York, Montreal, Hatties Camp, Collinstown, Hatfield.
(7) „	20-25	Cabot	Southampton, Foynes, Botwood, Montreal, New York.
(8) „	26-30	Cabot	New York, Botwood, Foynes, Southampton.
(9) Oct.	1-5	Albatross No. 1.	Hatfield, Collinstown, Hatties Camp, Montreal, New York.
(10) „	5-10	Albatross No. 2.	Hatfield, Collinstown, Hatties Camp.
(11) „	6-11	Albatross No. 1.	New York, Montreal, Hatties Camp, Collinstown, Hatfield.
(12) „	15-20	Mercury	Southampton, Foynes, Botwood, Montreal, New York.
(13) „	16-21	Cabot	New York, Montreal, Botwood, Foynes, Southampton.
(14) „	21-26	Mercury	New York, Montreal, Botwood, Azores, Lisbon, Southampton.

It will be noted that after flight number (10) Albatross No. 2 was not intended to return to England. The proposal was that this aircraft should stay in Newfoundland and make experimental flights from Hatties Camp in order to obtain first-hand information into the operation of landplanes there during the winter.

Of this programme the only flights made were numbers (1) and (2).

THE COMPOSITE AIRCRAFT.

Although the Mayo Composite aircraft has been described and illustrated on a great number of occasions, it may not be out of place to give here a very brief description of it. The basic object



SHORT-MAYO COMPOSITE AIRCRAFT, JUST AFTER SEPARATION.
(By courtesy of Imperial Airways. Topical Press Agency Photograph.)

of the design is to secure a good payload with a long range. This requires a high wing loading and a high power loading.

Increase in wing loading combined with increase in power loading in aircraft of normal type, leads to difficulty and ultimately to inability to take off. In the Mayo Composite design, wing and power loading can be increased beyond the limits permissible for aircraft of normal type by a considerable margin, the take off of the long range or upper component being achieved with the help of the lightly loaded lower component.

The Mercury (the upper component) is a small float seaplane powered with four Napier Rapier VI engines, each giving the maximum output of 395 horse power. This power would allow the Mercury to take off by herself up to a total weight of 15,500 lb., whereas with the assistance of the Maia, the Mercury can start her journey at a total weight of 27,500 lb. The increase in disposable load made possible by the assistance of the lower component, Maia, amounts to over 200 per cent.

The Maia is a four-engined flying-boat somewhat similar to the standard "C" class type of Imperial Airways' Fleet and powered with the same Bristol Pegasus X engines. The areas of the planing bottom of the hull and of the wings are both greater than in the standard "C" class in order to provide a rapid take off when lifting the Mercury.

In 1937 the Composite aircraft was still under construction and had not passed its final tests. It was an innovation of a startling kind, and many people wondered whether the principle would prove successful. The two components were first tested individually to prove that each was satisfactory. The next step was to mount the Mercury upon the Maia and test the efficiency of the releasing gear. These tests showed that there were no unforeseen difficulties, and trials then started with the two aircraft secured together and flying as a unit.

Many flights were made in this condition ; by means of indicating lights which show the forces acting between the two aircraft, it is possible to forecast what will happen on releasing the locking gear which holds them together. After a careful study of the forces, as revealed by these indicating lights under various conditions, the great moment arrived when the two test pilots decided to release the locking gear. First, the lock in the Mercury was opened, then that in Maia, and immediately the vertical separating force released the third and automatic lock, which is only opened by a force of the direction and intensity necessary to give rapid and vertical separation.

The two aircraft sprang apart, the Mercury climbing rapidly and the Maia losing height slowly ; they returned to Rochester as separate units. The great experiment had been successful. Subsequently these tests were carried out at increasing total weights of the Mercury, and in each case the rapid vertical separation was a marked feature. The photograph, taken immediately after separation, shows the absence of any tendency for one aircraft to foul the other. Many films taken of the actual separation strikingly confirm this quality

of the Composite design which, for reasons of safety, is of the greatest importance.

THE MODIFIED "C" CLASS.

As a result of the satisfactory performance of the *Caledonia* and the *Cambria* at higher total weights than is normal in "C" class flying-boats, and the progress which had been made in the refuelling of aircraft in flight, four modified flying-boats of the "C" class type specially adapted for North Atlantic work were ordered. They were given the names of *Cabot*, *Caribou*, *Connemara*, and *Clyde*.

The modifications consisted mainly in strengthening the structure to give the normal safety factors at a total weight of 53,000 lb. They would not be able to take off under their own power at this weight, and provision was made for them to take off at some lower weight, say, 46,000 lb., and be completed to their total authorised weight by adding fuel during flight. Special fittings were provided in the tail structure of each aircraft into which the refuelling hose from the tanker aircraft could be guided. During the winter of 1937 the special tail fittings were fitted to the *Cambria* and fuel was successfully added during flight.

Unfortunately the R.A.F. expansion programme and the difficulty of obtaining raw materials delayed the delivery of these aircraft until late in the year. On top of this, the international crisis of the early autumn caused further delay and prevented any crossings of the Atlantic before the advent of winter weather put an end to further experimental flights. As this article is being written the *Cabot* is due to start her first flight trials.

In these flying-boats the poppet-valved Pegasus engines have given place to Bristol Perseus sleeve-valve engines. The sleeve-valve engines promise a reduction in fuel consumption compared with the poppet-valve engines.

THE D.H.91 LANDPLANES.

These aircraft, to which the manufacturers have given the type name of *Albatross*, are low-winged, four-engined monoplanes of wooden construction. They are fitted with four Gipsy XII air-cooled engines. The first two of this type were ordered by the Air Ministry and fitted with special long-range tanks for use on the North Atlantic.

The D.H.91 as a type is remarkable for its extremely clean design, which results in a high cruising speed considering the power available. A high cruising speed is of particular importance on the North Atlantic service where head winds of high velocity are to be expected. The cruising speed of these aircraft can be well judged by the fact that recently one of the type flew from Croydon to Le Bourget in 53 minutes—an average speed of 238 miles per hour; the wind blowing at the time was across the course.

For Atlantic work, the D.H.91 landplanes have to take off at a higher total weight than they would do for normal operation. While taxiing after landing from a test at a high all-up weight, the first D.H.91 damaged her fuselage. This incident caused delay and

prevented these aircraft being ready in time to take part in Atlantic flights before winter weather supervened.

The use of landplanes for North-Atlantic services may occasion surprise, but if the use of the Direct Route *via* Ireland and Newfoundland is desired, then landplanes must be used during that part of the year when the waters in Newfoundland and Canada are icebound.

FLIGHTS BY THE MAYO COMPOSITE AIRCRAFT.

The Mercury and the Maia proceeded separately to the Shannon on July 18, to open the 1938 Atlantic programme. A temporary crane had been provided previously at Foynes with the help of which the Mercury was mounted on the Maia. The crew of the Mercury consisted of Captain D. C. T. Bennett and Radio Officer A. J. Coster. The crew of the Maia consisted of Captain A. S. Wilcockson and First Officer Frost.

The departure of the Mercury from Foynes had to await the arrival of the commercial load which she was to carry ; this consisted of 1,000 lb. of cinema films, newspapers, and photographs, mainly connected with the official drive of the King and Queen through Paris on July 19. It was hoped that by carrying this commercial load in the Mercury it would be possible to offer for sale in Canada and New York newspapers only two days old, and also to show in the picture theatres photographs taken two days previously.

The range of the Mercury with this payload was estimated to be in the neighbourhood of 3,000 miles, allowing for a reasonable head wind, and it was possible, therefore, that she could omit to call at Botwood and fly non-stop from the Shannon to Montreal. The weather forecast received on the evening of July 20 gave comparatively favourable winds for the early stages, developing into head winds later. Rain and low cloud were forecast after the first 400-500 miles. This forecast was in the main very accurate, but the force of the headwind was considerably stronger than forecast, particularly west of Newfoundland.

Before departure from the Shannon, the Mercury was loaded to 20,650 lb. The Mercury and Maia took off as a composite unit from Foynes at 7.55 p.m. local time on July 20. Separation of the two aircraft took place five minutes later. For the first seven hours of the flight, the average altitude of Mercury was 500 feet. Rain was encountered for most of that time after which the aircraft climbed above cloud and remained there until she was past Newfoundland and had reached Anticosti, where the cloud cleared away and the weather remained perfect until Montreal was reached at 10.15 local time. When the Mercury landed at Montreal there was sufficient fuel left for a further 1 hour 40 minutes flying. The distance flown was approximately 2,900 miles and the average ground speed 141 m.p.h.

After a wait at Montreal of approximately $2\frac{1}{2}$ hours, during which time the commercial load for Canada was disembarked and additional fuel taken on board, the Mercury left Montreal for New York and landed there at just after 3 p.m. local time on July 21.

The Commercial object of this flight was, therefore, achieved, and the newspapers were delivered and cinema films were shown in Montreal and New York within two days of production.

During the flight from the Shannon to Montreal, a track closely approximating to the Great Circle Course was maintained. During the first seven hours, excellent information was obtained from shipping in conjunction with the direction-finding wireless loop carried in the aircraft. Subsequently, a number of star sights were obtained until daylight, and after that the direction-finding stations in Newfoundland proved of great assistance.

The Mercury stayed in New York three days and left on July 25, arriving in Southampton on July 27.

As there is in existence at the moment only one lower component the Mercury could not be launched from Newfoundland to fly non-stop to the Shannon. However, by taking off under her own power at the maximum weight allowable under such conditions, she had sufficient range to fly from Botwood to the Azores, a distance of approximately 1,500 miles. No payload could be carried, however, as it was necessary to take all the disposable load in the form of fuel.

The Mercury flew from Botwood to Horta in the Azores on July 26, and proceeded from Horta to Lisbon and Southampton on the following day. A certain amount of difficulty was experienced in taking off from Horta as the harbour is small and there was a slight swell running beyond the harbour entrance. Most valuable co-operation and assistance were provided by the Portuguese authorities both at Horta and at Lisbon.

Although the Caledonia and the Cambria in 1937 did not carry any commercial load, they could have carried about the same load as was carried by the Mercury, but in other respects some striking differences are evident, for instance :—

(a) *Approximate cruising air speed :*

Mercury	170 m.p.h.
Caledonia and Cambria	150 m.p.h.

(b) *Average fuel consumption :*

Mercury	53 gals. per hour.
Caledonia and Cambria	110 gals. per hour.

(c) *Range in still air :*

Mercury	3,900 miles.
Caledonia and Cambria	3,150 miles.

These figures show an interesting contrast, but it should be noted that the Mercury subsequently took off successfully at a considerably higher total weight, namely, 27,500 lb. This with the same payload would have increased her range at least by 50 per cent.

THE ATTEMPT ON THE SEAPLANE RECORD.

So successful were the results with the composite aircraft that on the return of the Mercury to England it was suggested that instead of making the next trans-Atlantic flight on the programme the

Mercury might make an attempt on the seaplane record which was then held by a German Dornier 18 flying-boat which had been launched by catapult from its base ship off Dartmouth and had made a flight of 5,215 miles in 43 hours to Caravellas in Brazil. This aircraft was fitted with compression ignition engines of the Jumo type using heavy oil, whereas the Mercury was powered with the same petrol engines with which she flew the North Atlantic. It was hoped also that Mercury might break the world's long distance record then held by Russia for a flight from Moscow *via* Rudolf Island to Jacinto, a distance of 6,306 miles.

After careful consideration, it was decided that the record attempt should be made to South Africa and that to permit the Mercury under favourable conditions to break the world's long distance record, she should take off at Dundee. The great circle distance from Dundee to Capetown is sufficient to allow the record being broken by the amount required by international regulations. The distance from Dundee to Capetown is 6,400 miles.

Before this long distance flight could be attempted, it was necessary to investigate carefully whether the Mercury could cope with the large increase of total weight which would be necessary. In addition, extra fuel tankage had to be provided, and this was done by using the central sections of the floats as petrol tanks. At a total weight of 27,500 lb., wing loading was 45 lb. per sq. ft., and the power loading $17\frac{1}{2}$ lb. per h.p.

Apart from the question of whether the Mercury could sustain the additional weight, there was still the question of whether separation between the Maia and the Mercury could be obtained at the greater weight. It may be interesting to quote here from the official report of Captain Wilcockson who was commanding the Maia when the take-off was made at Dundee for the record flight :—

The buoy was dropped at 12.50 and I taxied down river. The wind had increased considerably and there was a distinct chop on the water. Captain Bennett then started the engines on the Mercury and ran them up while Maia was turning into wind opposite the Caledon shipyard. I asked Captain Bennett if everything was satisfactory and ready for take off and he said that he was quite ready. I opened the throttles on Maia fairly slowly, at the same time informing Captain Bennett of the throttle setting I wanted on Mercury. After a very short run of only 23 seconds we took off. The aircraft felt perfectly normal and started to climb fairly rapidly. Propellers were put to coarse pitch and Captain Bennett told he could throttle back to normal revs. on Mercury.

The green light came on surprisingly early shortly after take off, at a speed of 103–105 knots.

(NOTE.—*The green light shows that there is the proper separating force between the two components.*)

The aircraft was climbing quite well and I made a left-hand circuit, taking us over Newport and in the direction of Forfar.

I told Captain Bennett what was happening and asked if he was quite happy, and got a reply strongly in the affirmative. I then told him to release his lock and open up Mercury to full throttle. The r.p.m. on Maia was adjusted to 2,000 and the speed steadily increased to 130 knots. I asked if Captain Bennett was ready and counted "One, two, three, go." During the time of counting I let the speed increase to 138 knots and pulled my release lever at this speed. The r.p.m. on Maia was then about 2050. Immediately I pulled the lever I knew the separation was satisfactory, as the feeling in Maia was the same as the feel at lighter loads. There was nothing abnormal in the change of trim which I should say was about the same as that for 20,800 lb.

My first view of Mercury was well on her way South and some distance above me. During the whole of this flight there was nothing out of the ordinary ; control was good, even in bumps.

Maia landed back at 13.40 and was moored at 13.45.

From this it seems that even now the possibilities of the Composite system for take off at high wing loadings are not exhausted.

After taking off, the Mercury climbed to just below 5,000 feet, but occasional icing conditions forced the aircraft to descend to 3,000 feet, after which height was gradually gained. The English Channel was crossed at a height of 5,600 feet.

The course set for the flight was a direct one across central France and the Sahara. Darkness came on while the Mercury was over Central France in good weather conditions, and at dawn the following day she was over the Sahara, having crossed the Algerian coast at a height of 9,000 feet. Unfortunately during the night the wind, which had been westerly, backed to the southward, but later backed still further to E.N.E. Navigation over the Sahara was effected by star sights.

By the middle forenoon of the following day (October 7) the Mercury passed over Kano (Nigeria). For the following 500 miles intense and closely packed thunderstorms caused considerable inconvenience. Later, a south-west wind of considerable strength was experienced.

Darkness fell on the evening of October 7 when the aircraft was approaching Portuguese West Africa. During the night, the south-westerly wind continued. When abeam of Walvis Bay in South West Africa, at an hour before dawn on October 8, Captain Bennett thought that he might have to land at Luderitz Bay owing to shortage of fuel. On arrival there, however, he found that he had sufficient to reach the mouth of the Orange River. This river is considerably encumbered by sand banks, and after landing it was found impossible to taxi more than 40 yards from the landing area. However, a party of miners from the State diamond mines close by paddled a small dinghy across the mud and shallow water, and manhandled 40 gallon drums of fuel to the aircraft, after which the Mercury took off and proceeded to Cape Town.

The great circle distance from Dundee to the alighting area in the mouth of the Orange River was 6,045 miles, which exceeded by approximately 830 miles the seaplane record established by the German flying-boat, but fell short of the world's long distance record by 261 miles. The Mercury's time for this journey was 42 hours 6 minutes—practically an hour less than the German flying-boat took for her record flight. Under more favourable conditions the Mercury would have been able to reach Cape Town.

It is interesting that the last two holders of the seaplane record should have been helped into the air by some form of assisted take-off—the British using the Composite principle ; the Germans using a catapult mounted in a ship.

After arrival at Cape Town, the Mercury returned to England by short stages following the normal Imperial Airways' flying-boat route. During the Christmas mail period in the winter of 1938,



GERMAN TRANS-ATLANTIC LANDPLANE FOCKE-WULF CONDER, 25-30 SEATER TRANSPORT.
(By courtesy of Imperial Airways.)

the Mercury made two non-stop flights to Alexandria to assist the normal fleet with the carriage of the Christmas mails.

THE GERMAN FLIGHTS.

The German air transport company, Deutsche Luft Hansa, completed in all 14 return flights between July 14 and October 19, 1938. The aircraft used for these flights were float seaplanes of the Hamburger 139 type, launched from catapults mounted in their base ships. Three of these seaplanes were used—the Nordmeer, Nordwind, and Nordstern; the last of these three is a modification of the standard type, having a higher cruising speed. In addition a four-engined Focke-Wulf Condor landplane flew from Berlin to New York and back. This aircraft did not have the benefit of assisted take-off, but took off both from Berlin and from New York under its own power. Whether it would have been possible to carry any payload in that aircraft is not known, but it is thought to be unlikely over the distance flown.

Both in 1937 and 1938 the Germans used the Southern Route exclusively for their seaplanes; catapult ships were stationed at the Azores and New York, and flights were made non-stop between these two points avoiding Bermuda. Of all the nations engaged in experimental flights on the North Atlantic only the Germans operated a series approaching a regular service in frequency. They were able to do this by using aircraft of a type they had employed in 1937. Germany is the only country which has used the Azores regularly over a considerable period, and has been able to do so largely by the use of catapults for launching their aircraft, and does not, therefore, have to face the difficult problem of taking off a heavily-loaded aircraft from the constricted waters of Horta harbour.

Their catapult ships are provided with wireless and meteorological apparatus, and form completely equipped mobile bases both for operation and repair and maintenance. The experience that the German company has gained in regular operation over the South Atlantic has stood them in good stead for the North Atlantic also.

THE FRENCH FLIGHTS.

French operations on the North Atlantic are controlled by a company known as Air France Transatlantique, which is a combination between Air France and the French trans-Atlantic shipping organisation.

The French have apparently taken the view that their best course is to fly non-stop from their new airports at Biscarosse and Bordeaux to New York. This distance (which is approximately 3,700 miles) is the range specified by the French for new designs of aircraft for the Atlantic. These aircraft, which are now in course of construction, were not available for operation in 1938.

The French have, however, in the "Lieutenant de Vaisseau Paris" a flying-boat of large size which had already made long-range flights, and it was this aircraft which they used on the North Atlantic during the summer of 1938. The "Lieutenant de Vaisseau Paris"

does not possess sufficient range to fly from Biscarosse to New York non-stop. She left Biscarosse and arrived at Lisbon on August 23 ; left Lisbon on the following day, and left Horta in the Azores on the 30th. She flew non-stop from Horta to New York in twenty-two hours, arriving there on August 31. Although this time for the flight from Horta to New York may appear to be long, it should be remembered that the aircraft is some years old and was designed before the speed of aircraft had been raised to the general level at which it stands to-day.

The " *Lieutenant de Vaisseau Paris* " remained in New York until September 9, when she returned *via* the Azores to France. It is understood that she was to have made a second return flight at the end of September, but this was abandoned owing to the European crisis.

THE AMERICAN SITUATION.

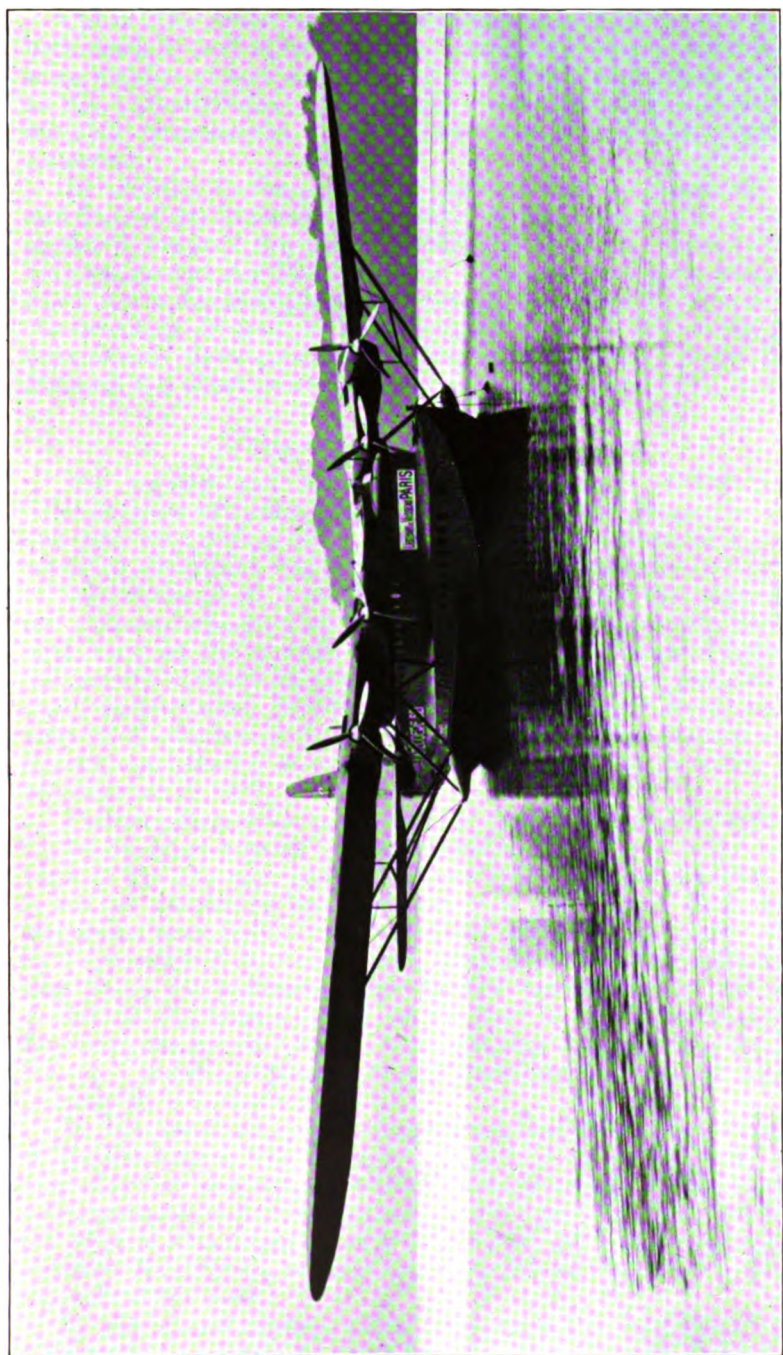
Pan American Airways made no crossings of the Atlantic during 1938. As mentioned previously the flying-boat which that company used in 1937 had reverted to its normal duties and was not available for trans-Atlantic experimental flights this year.

Apart from this, Pan American Airways are believed to have hoped for at least one of the new Boeing 314 flying-boats in the early summer of 1938. These aircraft are considerably larger than the Sikorskys and Martins used on the Pacific services, have a total weight of approximately 90,000 lb. and are powered with four Twin Row Wright Cyclone engines. It is stated that the Boeing 314 will be capable of carrying 40 passengers across the Atlantic. The cruising speed is thought to be in the neighbourhood of 170 miles per hour.

As in the case of the British programme, however, hopes of new American aircraft being available for 1938 were disappointing. The first Boeing 314 was found to need modification when she was first tested. These alterations delayed the completion of the tests and it was not until the autumn that the preliminary tests were successfully passed. The first of these aircraft is now being tested by the United States authorities for its Certificate of Airworthiness.

The main developments in the American situation in 1938 were not connected with flights but with organisation. The shipping organisation, American Export Lines Inc., formed a subsidiary company called American Export Air Lines Inc. with the avowed purpose of operating services between the United States and Mediterranean countries, which is the area served by the parent company's ships.

After considerable discussion Pan American Airways and American Export Air Lines reached an agreement which assigns to each company the geographical areas they shall respectively serve. Under this agreement, France, Germany, and Russia remain in the spheres of both Pan American Airways and American Export Air Lines. Great Britain and the Northern countries of Europe form Pan American Airways' sole province, leaving to American Export Air Lines the Mediterranean countries and Western Asia. This agreement is said to be for fifteen years.



FRENCH TRANS-ATLANTIC FLYING BOAT, "LIEUTENANT DE VAISSEAU PARIS."

(By courtesy of the Ministry of Marine and the *Société Industrielle d'Aviation Latécoère*.)

It has been stated on a number of occasions in the United States both officially and otherwise that America will seek to operate the same number of services to Europe as European countries operate to the United States, which would mean that of all the services operated between the United States and Europe half would be American.

In addition to the agreement between Pan American Airways and Export Air Lines another form of co-operation on the Atlantic appeared towards the end of 1938; this was an understanding between Export Air Lines and the Italian air transport company, Ala Littoria, for the operation of air services across the Atlantic by the Southern Route. It is understood that the Italian shipping lines already have an understanding with American Export Lines Inc. and this development is therefore natural.

GROUND ORGANIZATION.

The wireless and meteorological organization of the North Atlantic route *via* Ireland and Newfoundland was increased in scope and efficiency during 1938. Additional wireless transmitting and receiving equipment was supplied both to the Shannon station and to Newfoundland, as it had been found during 1937 that there were not sufficient channels of communication for satisfactory working both between the aircraft and the ground stations and between the ground stations themselves. The meteorological organization again demonstrated its efficiency and accuracy, but owing to the very small number of flights actually made, did not have a satisfactory opportunity to put into practice those lessons which had been learned in 1937.

Further progress was made with the preparation of the aerodrome at the Shannon airport. This aerodrome is situated on the north bank of the Shannon and has necessitated extensive draining. It is not yet completed but a runway was provided at Collinstown aerodrome near Dublin from which the Albatross landplanes could have operated if they had been available. The Government of Eire has a comprehensive plan for the provision of a combined airport on the Shannon, the marine part of which would replace Foynes in due course. Such a combined airport would make possible the rapid transfer of passengers and other load from marine aircraft to landplanes, and vice versa.

In Newfoundland further progress was made with the aerodrome at Hatties Camp. The majority of the airport buildings are now erected and at least one of the main runways is ready for use. Extensive investigation has taken place into the best way of controlling the snow at this airport, and it is believed that it will be possible to make the runways suitable for use under all climatic conditions throughout the year.

In the Azores certain plans have been put forward for the development of Horta harbour in order to make it more suitable for use by heavily loaded flying-boats. These plans, however, necessitate expenditure of a considerable sum of money and involve

the construction of works of a major kind ; no decision has yet been reached on this problem.

At Lisbon a small airport is being provided under the auspices of Pan American Airways pending a decision by the Portuguese Government as to the provision of a permanent port for marine aircraft.

DEVELOPMENTS IN 1939.

It seems reasonable to hope that the period of experimental flying across the Atlantic is reaching its close and that 1939 may see the establishment of regular services even though they operate only for a few months during the best season of the year.

By the time the harbours in Newfoundland become free of ice, Imperial Airways should have four Modified " C " class aircraft for use on the Atlantic ; with these four aircraft it may be possible to operate scheduled services starting with a frequency of one service a week in each direction ; later, it is hoped that this frequency can be increased. In addition to these four aircraft, tanker aircraft will be required for completing them with fuel in flight. It is hoped that these tankers also will be ready to make a start when Newfoundland waters are ready. On the American side it seems likely that more than one of the large Boeing flying-boats will be available for Atlantic work.

In addition, American Export Air Lines are expected to have at least one Consolidated flying-boat ; but it is understood that this will not be used for regular services in 1939, but rather for exploratory flights along the Southern Route.

The Germans should be able to repeat their successes of the last two years and operate a regular service, if they can reach some arrangement with the United States which will give them the permission necessary to operate regular services. They will presumably have to confine themselves to the carriage of mails as catapulting is not likely to be suitable for passenger services.

From such information as is available it seems unlikely that the French will be able to operate regular services across the Atlantic in 1939, although it may be expected that a number of experimental flights will be made.

The immediate intentions of the Italians are not known, but it is thought that they are concentrating upon the use of large flying-boats for the Atlantic service.

The British Commonwealth of Nations is in a special position as far as the North Atlantic service is concerned in that the British services will be directed towards providing air communication with Canada in addition to the United States. The other nations involved are interested chiefly in the United States. As has been previously explained, the British North Atlantic services are to be operated by a joint company represented by the United Kingdom, Canada, and Eire. This arrangement emphasises the co-operative nature of the British plan which may be regarded as another link in the chain which will eventually girdle the world and connect together all units of the British Commonwealth.

H. BURCHALL.

REFERENCE SECTION

Comprising

DIMENSIONS AND PARTICULARS OF BRITISH AND
FOREIGN WARSHIPS

TABLES OF COMPARATIVE NAVAL STRENGTH

BRITISH AND FOREIGN AIRCRAFT TYPES

BRITISH AND FOREIGN ORDNANCE TABLES

MISCELLANEOUS

PROFILES OF BRITISH AND FOREIGN WARSHIPS

PLANS OF BRITISH AND FOREIGN WARSHIPS

**DIMENSIONS AND PARTICULARS OF
BRITISH AND FOREIGN WARSHIPS**

LIST OF BRITISH AND FOREIGN SHIPS.

Warships are arranged in classes, except in some instances where they are arranged alphabetically. The following abbreviations are used throughout the List:—

a.g.b. Armoured gunboat.	s.c. Seaplane carrier.
g.b. Gunboat.	H.N.s. Harvey nickel steel.
b. Battleship.	H.s. Harveyised or similar
b.c. Battle-cruiser.	hard-faced steel.
l.c.r. Light cruiser.	K.s. Krupp steel.
c.d.s. Coast-defence ship.	t. Speed and H.P. at trials
M.Cr. Minelaying cruiser.	(in speed and H.P.
cr. Cruiser.	columns).
A.A. or H.A. Anti-aircraft guns.	b.p. or p.p. Length of ship between
A.C. Aircraft carrier.	perpendiculars.
A.T. Aircraft tender.	
L. Light guns under 15 cwt., including boats' guns.	
M. Machine guns.	

Torpedo Tubes: (D.) = double; (T.) = triple; (Q.) = quadruple; (sub.) = submerged; a.w. = above water.

The following abbreviations are used to distinguish the various types of boilers:—

W.T. Water-tube boilers, where the	My. Myabara.
type is not known.	Nic. Niclausse.
B. Belleville.	Pen. Penhoet.
Bl. Blechynden.	T. Thornycroft.
B. & W. Babcock and Wilcox.	T.S. Thornycroft-Schulz.
D'A. D'Allest.	Y. Yarrow.

The following abbreviations distinguish types of machinery:—

P.T. Parsons turbines.	tur. Turbines, where the type is
C.T. Curtis turbines.	not known.
B.C.T. Brown-Curtis turbines.	recip. Reciprocating engines.
(G.) Geared turbines.	I.C. Internal combustion engines.
W.G.T. Westinghouse geared turbines.	

In later pages (marked P1, P2, etc., towards the end of the volume) plans of most of the ships appear.

Unless otherwise stated, the displacements are Standard displacements (i.e. excluding fuel and reserve feed water).

GREAT BRITAIN.—Battleships and Battle Cruisers.

Class	NAME.	Standard Displacement.	Length. (Extreme.)	Beam (Extreme.)	Normal Draught.	Horse-Power. Type of Boilers.	Where Built.	Makers of Engines. Type of Machinery.	Date of Launch.	Date of Completion.	Cost.	Armour.						Armament.		Speed.	Complement (War).
												Belt.	Deck.	Side above Belt.	Bulkhead.	Gun Position. Heavy (guns.)	Second-ary.	Guns.	Torpedo Tubes.		
b.	Lion . . .	10,000	ft.	ft. ins.	ft. ins.				Bdg.		£	in.	in.	in.	in.	in.	16-in. guns.	16-in. guns.	knots.		
b.	Temeraire .								Bdg.												
b.	King George V.	35,000					Vickers-Walker	Vickers (Burrow) (G.)	Bdg.												
b.	Prince of Wales	35,000					CammeU Laird	CammeU Laird (G.)	Bdg.												
b.	Duke of York	35,000					J. Brown	J. Brown (G.)	Bdg.									10 14-in., 16 5-25-in.			
b.	Beatty . . .	35,000					Fairfields	Fairfields (G.)													
b.	Jellicoe . .	35,000					Swan Hunter	Wallsend (G.)													
b.	Nelson . . .	33,950	710	106 0	30 0	45,000	N'weston-Tyne	Wallsend B.C.T. (G.)	1925	1927	6,410,071	14	6½	..	16-9	..	9 16-in., 12 6-in., 6 4-7-in. A.A.; 4 3-pr., 3 2-pr. mult. p.p.; 5 m.; 11 L.; 2 2-pr. Pom Poms in Nelson.	2 (sub.) 24"	23	1360	
b.	Rodney . . .	33,900					Birkenhead	CammeU Laird	1925	1927	6,148,319									1315	
b.	Ramillies .		620½	102 0			Dalmuir	Beardmore, P.T.	1916	1917	3,295,810									1010	
b.	Resolution .		620½	101 4			Jarrow	Palmer P.T.	1915	1916	2,440,680									1012	
b.	Revenge . .	29,150	625½	101 5	29 0	40,000 Y.	Barrow	Vickers P.T.	1915	1916	2,406,368	13-4	4-1	6	6-4	11	6	8 15-in., 12 6-in., 4 3-pr., 2 2-pr. Pom Poms; 8 4-in. A.A.; 5 m.; 11 L. Resolution and Royal Oak have a catapult on X turret and carry 1 aircraft. Revenge and Ramillies have 4 4-in. A.A.	2 (sub.) 21"	23½	1104
b.	Royal Oak .		620½	102 1			Devonport	Hawthorn P.T.	1914	1916	2,468,269									1149	
b.	Royal Sovereign		620½	101 6			Portsmouth	Parsons P.T.	1915	1916	2,570,504									1104	

b.	Malaya†	31,100 640‡	104 0	31 3	75,000 B. & W.	Walker P.T.	1915 1916 2,945,709	13-6	3-1	6	4-2	11	6	8 15-in., 12 6-in., 8 4-in. A.A., 4 3-pr., 2 2-pr.; 5 m.; 11 L.; 1 catapult, 1 aircraft.	25||	1136
b.	Valiant§	31,100 639‡	104 † 0 31 3	75,000 B. & W.	Govan B.C.T.	Fairfield B.C.T.	1914 1916 2,537,037	13-6	3-1	6	4-2	11	6	8 15-in., 12 6-in., 4 3-pr., 4 4-in. A.A.; 2 2-pr Pom Poms; 5 m.; 11 L.; 1 catapult, 1 aircraft.	25||	1136
b.	Queen Elizabeth §	31,100 644‡	104 0	31 3	75,000 B. & W.	Portsm'th P.T.	1913 1915 2,473,103	13-4	3-1	6	4-2	11	6	8 15-in., 12 6-in., 4 3-pr., 2 2-pr. Pom Poms, 8 4-in. A.A.; 5 m.; 11 L.	25||	1187
b.	Barham.	31,100 643‡	104 0	31 3	75,000 Y.	Clydeb'nk J. Brown B.C.T.	1914 1915 2,470,113	13-4	3-1	6	4-2	11	6	8 15-in., 12 6-in., 8 4-in. A.A., 4 3-pr.; 5 m.; 11 L. 1 catapult, 1 aircraft	25||	1126
b.	Warspite	30,600 644‡	104 † 0 28 2	75,000 Y.	Devonp't Hawthorn P.T.	1913 1915 2,518,360	13-6	3-1	6	4-2	11	6	8 15-in., 8 6-in., 4 3-pr., 8 4-in. A.A.; 5 m.; 11 L.; 1 catapult, 1 aircraft.	2 25|| (sub.) 21"	1130	
b.c.	Hood	42,100 860‡	105 3	28 6	144,000	Clydeb'nk J. Brown B.C.T. (G.)	1918 1920 5,698,946	12-6	3-1	7-5	5-4	11	(a) 8 15-in., 10 5·5-in., 8 4-in. A.A., 4 3-pr., 2 2-pr.; 5 m.; 11 L.	4 31 1341 a.w. (sub.) 21"	1341	
b.c.	Renown*.	32,000 794‡	102 4	31 0	112,000 B. & W.	Govan B.C.T.	1916 1916 3,117,204	9-3	2	6-3	4-3	11-7 K.C.	6	6 15-in., Repulse; 12 4-in., 4 3-pr.; 5 m.; 11 L.; (sub.) catapult and 4 aircraft.	31·5||	1188
b.c.	Repulse*.	32,000 794‡	102 6	31 0	112,000 B. & W.	Clydeb'nk J. Brown B.C.T.	1916 1916 2,829,087	K.C.	9-3 K.C.	6-3	4-3	11-7 K.C.	6 K.C.	6 15-in., Repulse; 12 4-in., 4 3-pr.; 5 m.; 11 L.; (sub.) catapult and 4 aircraft.	21 31·5|| (sub.) 21"	1209

* Repulse reconstructed 1936. Renown now in hand for modernisation, including re-engining.

† Built at the charge of the Federated Malay States.

‡ In hand for reconstruction similar to Warspite.

† Repulse has 8 a.w. tubes in addition.

|| Speed without bulges.

(a) Guns are in shields of 1-in. H.T. plating

† Over rubbers.

GREAT BRITAIN.—Aircraft Carriers.

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Class.	NAME.	Standard Displacement.	Length. (Extreme.)	Extreme breadth under water over rubbers.	Draught.	Horse-Power. Type of Boiler.	Where Built.	Maker of Engines, Type of Machinery.	Date of Launch.	Date of Completion.	Cost.	Armour.			Armament.		Speed.	Complement (War.)
		tons.	ft.	ft. ins.	ft. ins.						£	Belt.	Deck.	Gun Position.	Guns.	Torpedo Tubes.	knots.	
A.C.	Implacable	23,000							Bldg.			in.		in.	4.5-in. guns		knots.	
A.C.	Illustrious	23,000				111,000	Vickers (Barrow)	Vickers (Barrow)	Bldg						16 4.5-in. guns; 20 smaller	20	30½	
A.C.	Victorious						Vickers (Walker)	Wallsend	Bldg.									
A.C.	Formidable						Harland & Wolff	Harland & Wolff	Bldg.						4.5-in. guns	—	30 (about)	
A.C.	Indomitable	23,000					(Belfast) Vickers-Armstrong	Vickers-Armstrong	Bldg.									
A.C.	Ark Royal	22,000	800	94 0	23 0	102,000	Barrow	P.T.(G.)	1937	1938	3,310,639	..	..	..	16 4.5-in. guns; 4 3-pr., 70 aircraft	4	30¾	..
A.C.	Argus II	14,000	567	75 9	21 0	20,000	Dalmuir	Beardmore P.T.	1917	1918	Purchased under construction	..	..	..	4 3-pr., 4 M., 10 L., accommodates 20 aircraft	—	20.2	420
A.C.	Courageous	22,500					(Walker Armstrong)	Parsons P.T.(G.)	1916 As aircraft carriers.	1928 { As aircraft carriers.	1,785,940 (a) 2,115,944 (b)	3		9-7	16 4.7-in. H.A., 4 3-pr., 3 2-pr. Pom Poms, 4 M., 10 L., 48 aircraft	—	30½	770
A.C.	Glorious		786½	90 6 over rubbers	22 3	90,000 Y.	Belfast	Harland & Wolff P.T.(G.)	1916 As cruisers.	1930 { As aircraft carriers.	2,119,066 (a) 2,137,37, (b)	3		9-7				

A.C.	Eagle, ex-Almirante Cochrane.	667½	105	2	21	11	50,000	Walker Y. (Armstrong)	J. Brown B.C.T.	1918 As a battle- ship.	1924 As an aircraft carrier.	4,211,576	..	..	9 6-in., 4 4-in. A.A., 4 3-pr., 2 2-pr. Pom Poms, 32 smaller, 20 aircraft	24	753
A.C.	Furious	22,450	786½	90½	1	21	6 90,000	Walker Y. (Armstrong)	Wallsend Engn'g Co. B.C.T. (G.)	1916 As a cruiser.	1925 As an aircraft carrier.	2,436,603	3	7	10 5.5-in., 3 4-in. A.A., 4 3-pr., 2 2-pr. Pom Poms, 46 smaller, 33 aircraft	31	728
A.C.	Hermes	10,850	600	70	3	18	7 40,000	Elswick	Parsons Co. P.T. (G.)	1919	1924	2,030,263†	..	..	6 5.5-in., 3 4-in. A.A., 4 3-pr., 2 2-pr. Pom Poms, 4 M., 16 L., 15 aircraft	25	551
S.C.	Pegasus*	6900	366	50	10	17	6 3000	Blyth	Blyth S. B. Co. recip. Sydney	1914	1914	Purchased under con- struction	..	..	4 M., 10 L., 1 catapult	11	139
S.C.	Albatross¶	4800	443¾	61	0	15	6 12,000	Cockatoo Island (a)		1928	1929				4 4.7-in. A.A., 4 2-pr. Pom Poms, 4 3-pr., 4 M.; 20 L.; 9 sea- planes	21	350

* Used for experimental work.

¶ Used as a training carrier.

(a) First cost of ship as a cruiser.

† Estimated cost including guns.

¶

§ Over rubbers; 120 ft. over pallisades.
¶ Transferred from Royal Australian Navy.

(b) Estimated cost of reconstruction as an aircraft carrier.

GREAT BRITAIN.—Cruisers.

Class.	NAME.	Standard Displacement.	Length (Extreme).	Beam (Extreme).	Draft.	Horse-Power.	Type of Machinery and Boilers.	Where Built.	Make of Engines.	Date of Launch.	Date of Completion.	Cost.	Armour.			Armament.		Speed.	Complement (War).
													Belt.	Deck.	Gunn Position.	Guns.	Torpedo Tubes.		
Norfolk Class	Dorsetshire .	997½	6:3	66 0	17 0	80,000	(G.)	Portsmouth.	Cammell Laird	1929	1930	2,101,951	in.	..	in.	8 8-in., 8 4-in. A.A., 4 3-pr., 2 2-pr. Pom Poms, 2 M., 10 L., 1 aircraft, 1 catapult.	8 21" (Q.)	32½	710
	Norfolk .	992½						Fairfield	Fairfield	1928	1930	2,141,961	..	..	..				685
York Class	Exeter .	8390	57½	58 0	17 0	80,000	(G.)	Devonport.	Parsons	1929	1931	1,837,415*	..	..	..	6 8-in., 4 4-in. A.A., 4 3-pr., 6 M., 8 L., 2 aircraft in Exeter, 1 aircraft in York.	6 21" (Q.)	32	630
	York .	8250		57 0		Y.		Palmers'	Palmers'	1928	1930	1,774,276	..	..	..			32½	623
London Class	Shropshire .	9830	633	66 0	17 0	80,000	(G.)	Dalmuir.	Beardmore	1928	1929	1,941,950†	..	..	..	8 8-in., 8 4-in. A.A., 4 3-pr., 4 M., 10 L., 1 aircraft, 1 catapult.	8 21" (Q.)	32½	635
	Sussex .	9830	633	66 0	17 0	80,000	(G.)	Hawthorn Leslie.	Hawthorn Leslie.	1928	1929	1,975,800†	..	..	..	
Kent Class	Devonshire .	9850	630	66 0	17 0	80,000	(G.)	Devonport.	Vickers	1927	1929	2,007,275	..	..	..	
	London .	9850	630	66 0	17 0	80,000	(G.)	Portsmouth.	Fairfield	1927	1929	1,966,559	..	..	..	
Kent Class	Suffolk .	10,000	630	68 4	16 7	50,000	(G.)	Portsmouth.	Parsons	1926	1928	2,180,240†	..	..	..	8 8-in., 8 4-in. A.A., 4 3-pr., 4 2-pr. Pom Poms, 4 M., 8 L., 3 aircraft	..	31½	700
	Berwick .	10,000	630	68 4	16 7	50,000	(G.)	Govan.	Fairfield.	1926	1928	2,029,526	..	..	..	
Improved Southampton Class	Cornwall .	10,000	613½	63 4	..	80,000	(G.T.)	Devonport.	Beardmore	1926	1928	1,252,110*	..	..	..	Cumberland and Suffolk, 6 4-in. A.A., Kent, 1 aircraft.	6	32½	..
	Cumberland .	10,000	613½	63 4	..	80,000	(G.T.)	Barrow .	Vickers	1926	1928	2,980,821*	..	..	..	
Improved Southampton Class	Kent .	10,000	613½	63 4	..	80,000	(G.T.)	Chatham	Hawthorn	1926	1928	2,084,213†	..	..	..	
	Edinburgh .	10,000	613½	63 4	..	80,000	(G.T.)	Swan	Wallis & Smedley	1926	1928	2,127,658†	..	..	..	
Improved Southampton Class	Hunter .	10,000	613½	63 4	..	80,000	(G.T.)	Hunter	Harland & Wolff	1926	1928	2,141,514†	..	..	..	12 6-in., 12 4-in. A.A., 20 smaller.	6	32½	..
	Belfast .	10,000	613½	63 4	..	80,000	(G.T.)	Harland & Wolff	Harland & Wolff	1926	1928	2,141,514†	..	..	..	

South- ampton Class	Liverpool	9400	591½	62 4	17 0	82,500 T.G.	Fairfield . Hawthorn Devonp't	1937	1938	1,930,000† each	..	..	12 6-in., 8 4-in. A.A., 20 smaller, 1 catapult, 3 aircraft	6 21"	32	740
	Manchester						Scotts									
	Gloucester						J. Brown									
	Newcastle						Vickers									
Fiji Class	Glasgow	9100	591½	61 8	17 0	75,000 T.G.	Tyne Scotts Vickers	1936	1937		..	..		
	Sheffield						Tyne Vickers									
	Birmingham						Devonp't J. Brown									
	Ceylon						..	Pro- jected	..	..	..	..	6-in. guns.			
Aethusa Class	Jamaica						..									
	Gambia						..									
	Uganda						..									
	Kenya						..									
Modified Leander Class	Mauritius	8000					J. Brown									
	Nigeria						A. Stephen									
	Trinidad						Swan									
	Aurora						Hunter									
Leander Class	Penelope	5270					Vickers	Bldg.	..	..	..	..
	Galatea						Armstrong									
	Arethusa	5220					Devonp't									
	Amphion	7040	560	56 8	15 8	72,000 T.G.	Ports- mouth Harland & Wolff	1936	1937	1,233,921†	..	..	6 6-in., 4 4-in. A.A., 9 smaller, 1 cata- pult, 1 aircraft.	6 21"	32½	500
Leander Class	Ajax	6985					Scott									
	Neptune	7175	554½	55 8	16 0	(G.)	Chatham									
	Orion						Parsons									
	Amphion						Beardmore									
Leander Class	Ajax	6985					Ports- mouth Harland & Wolff	1934	1935	1,506,668†	..	..	8 6-in., 4 4-in. A.A., 2 smaller, 1 catapult, 2 aircraft	8 21"	32½	590
	Neptune	7175	554½	55 8	16 0	(G.)	Vickers									
	Orion						Parsons									
	Amphion						Devonp't									

* Total estimated cost of ship, including guns.

† Estimated cost, excluding armament and ordnance stores.

‡ Total estimated cost including guns and aircraft.

GREAT BRITAIN.—Cruisers, &c.—continued.

Class.	NAME.	Standard Displacement.	Length. (Extreme.)	Beam. (Extreme.)	Draught.	Horse-Power. Type of Machinery.	Where Built.	Maker of Engines.	Date of Launch.	Date of Completion.	Cost	Armour.		Torpedo Tubes.	Speed.	Complement (War).
												Belt.	Deck.			
E Class	Emerald	7550	570	54 7	16 8	80,000 (G.)	Armstrong	Wallsend.	1920	1926	£1,617,120	in.	3-1½	16	33	577
	Enterprise	7580	570	54 9	16 8	80,000 (G.)	J. Brown	J. Brown.	1919	1926	1,690,658*	..	1	21*	33	577
D Class	Diomedes	4850	471½	46 3	14 3	40,000 (G.)	Vickers	Vickers	1919	1922	1,016,870	3	—	12	29	460
	Despatch	4850	472½	46 9	14 3	40,000 (G.)	Fairfield	Fairfield	1919	1922	954,667	Shields	—	21*	29	460
	Durban	4850	472½	46 9	14 3	40,000 (G.)	Scotts	Scotts	1919	1921	954,667	3	—	21*	29	460
	Dunedin	4850	471½	46 3	14 3	40,000 (G.)	Armstrong	Hawthorn	1918	1919	785,145	3	—	12	29	460
	Delhi	4850	472½	46 9	14 3	40,000 (G.)	Wallsend.	Wallsend.	1918	1919	701,600	3	—	21*	29	460
	Danaë	4850	472½	46 9	14 3	40,000 (G.)	Armstrong	Wallsend.	1918	1918	750,025	3	—	21*	29	460
Hawkins class	Dauntless	9550	605	65 1	17 3	55,000 (G.)	Palmer	Palmer	1918	1918	690,083	3	—	6	29½	713
	Dragon	9550	605	65 1	17 3	55,000 (G.)	Scotts	Scotts	1917	1918	690,083	3	—	6	29½	713
	Edinburgh	9860	605	65 1	17 3	65,000 (G.)	Portsmouth	Harland & Wolff	1921	1925	2,138,999	3	—	21"	30½	715
	Frobisher	9860	605	65 1	17 3	65,000 (G.)	Devonport.	Wallsend	1920	1924	2,035,915†	3	—	21"	30½	715
Carlisle Class	Hawkins	9800	605	65 1	17 3	55,000 (G.)	Chatham	Parsons	1917	1919	1,599,741	3	—	21"	29½	747
	Cairo	4200	451½	43 10	14 1	40,000 (G.)	Cammell Laird	Cammell Laird	1918	1919	787,479	3	—	8	29	415
	Capetown	4200	451½	43 10	14 1	40,000 (G.)	Cammell Laird	Cammell Laird	1919	1922	984,720	3	—	21"	29	415
	Calcutta	4200	451½	43 10	14 1	40,000 (G.)	Vickers	Vickers	1918	1919	832,123	3	—	21"	29	415
Carlisle Class	Carlisle	4200	451½	43 10	14 1	40,000 (G.)	Fairfield	Fairfield	1918	1918	669,216	3	—	21"	29	415
	Colombo	4200	451½	43 10	14 1	40,000 (G.)	Fairfield	Fairfield	1918	1919	692,308	3	—	21"	29	415

GREAT BRITAIN.—Miscellaneous Craft.

Patrol Vessels.—P.C. 74, 610 tons, 20 knots, 1 4-in.; Kingfisher, Mallard & Puffin (1935-36), 510 tons, speed 20 knots, 1 4-in., H.A., 8 L.; Kittiwake, Sheldrake & Widgeon, 530 tons, 20 knots, 1 4-in., 8 L.; Guillemot, Pintail, Shearwater building, 530 tons, 20 knots, 1 4-in. H.A.

Training Ships and Gunnery Drill Ships (ex-Monitors).—Erebus, 7,200 tons; Marshal Soult, 6,400 tons, 2 15-in. guns, 2 3-in. H.A. guns.

Fishery Protection Gunboats (ex-trawlers).—Colne, Doon, Dee, Eden, Foyle, Garry, Kennet, Liffey, 490-550 tons, 11 knots, reciprocating machinery, 1 12-pr.; Mastiff, 400 tons, 13 knots, 1 4-in. gun.

Destroyer Depot Ships.—Greenwich (1916), 8,100 tons, 4 4-in. guns; Woolwich (1935), 8,750 tons, 15 knots, 4 4-in. A.A. Tyne, (building) 11,000 tons, 4 5-in. guns, H-cia, building.

Submarine Depot Ships.—Lucia, 5,800 tons; Titania, 5,250 tons; Alecko, 935 tons; Cyclops, 11,300 tons, 13 knots; Medway (Vickers', 1929), displacement 14,650 tons, speed 15 knots, armament 2 4-in., 4 4-in. A.A., 4 3-pr. Maidstone, 8,900 tons, 17 knots, 8 4.5-in., 4 3-pr. Forth, building.

Repair Ships.—Resource (Vickers', 1930), displacement 12,300 tons, speed 15 knots, armament 4 4-in. A.A.

Minelayers (ex-Monitors). 1915.—Medusa, Melpomene, Minerva, 3.5 tons, 10 knots; (ex-trawlers) Vernon, 430 tons; Linnet, 498 tons, 10½ knots; Plover, 805 tons, 14½ knots. Redstart and Ringdove (as Linnet), building. Abdiel, Latona, Manxman, 2,650 tons, building.

Surveying Vessels.—Fitzroy, Flinders, and Kellott, 800 tons, 16 knots, 1 3-pr.; Herald, 1,650 tons, 15½ knots, 1 3-pr.; Endeavour, 1,280 tons, 13 knots, 1 3-pr.; Challenger, 1,140 tons, 1,200 H.P. (recip.), 12½ knots; Franklin, 830 tons, 17 knots, 1 3-pr. Scott, building.

Non-magnetic Survey Vessel.—Research, building by Phillips at Dartmouth. Sailing vessel.

Netlayer and Target Towing Vessels.—Guardian (Chatham, 1931-3), 2,860 tons, 6,500 H.P., 18 knots, 2 4-in. A.A. Protector (1931 programme), 2,900 tons, 20 knots, 1 4-in.

Mining School (Vernon) Tender.—Nightingale (Portsmouth, 1931), Skylark (Portsmouth, 1932), displacement 275 tons, horse-power 400, speed 10 knots, coal capacity 15 tons.

Boom Defence Vessels.—Moorgate (Bow, Maclean 1931), 345 tons, 1 3-in. gun; Bishopsgate (Henry Robb, 1932) and Aldgate (1934); Watergate (1934); Ludgate, Dowgate, 290 tons, Dunnet (1937), 350 tons, 1 3-in. 21 vessels building.

Tenders.—(For Submarine depot, Portland), Elin (1935), 224 tons, 230 H.P., 9½ knots. (For Torpedo School) Redwing (1933), 225 tons, 250 H.P., 9½ knots.

Gunnery Training Ship.—Battleship Iron Duke has been de-militarised under the London Treaty and converted to a Gunnery Training Ship (1931-32).

Fleet Target Ship.—Centurion (ex-battleship), 25,500 tons.

Trawlers.—Basset (1935), 160 tons, 1 4-in. gun; James Ludford, Blackwater, Foyle and Kinnett (War built), 400-500 tons; Lilac, Laurel, Holly, Hawthorn, Cedar, Cypress, Sycamore, Spruce, Magnolia, Willow, 570-600 tons, 1 4-in. gun; Tourquize, Topaze, Sapphire, Tourmaline, Jasper, Cornelian, Pearl, Ruby, Amethyst and Agate, purchased in 1935, 580-640 tons, 1 4-in. gun.

Special Service Vessel.—Lasso, 903 tons, 13 knots.

Motor Torpedo Boats.—Nos. 1-12 and 14-19 are of the same design. 18 tons, 1,500 B.H.P., 8 small guns, 2 torpedoes. There is no No. 13 M.T.B. Six M.T.B.'s to be built by Vosper and Thornycroft have been designated M.T.B.'s 20-25, about 32 tons. B.H.P. 3,150. 2 torpedoes. M.T.B. 101, 22 tons. M.T.B. 102, 28 knots. 3,000 B.H.P. "Bloodhound," 35 tons; length, 68 ft.; beam, 19 ft.; 25 knots.

Motor Minesweepers.—Nos. 1 and 2, 32 tons, 1,500 H.P., 15 knots.

Training Ship.—The liner Majestic was purchased 1936, and is being converted to a training ship and will be renamed Caledonia.

Auxiliaries.—Tugs, Drifters, Hospital Ship (Maine, 10,100 tons), Oilers, Store ships, etc.

Monitors.—Terror 7200 tons, 12 knots, 2 15-in., 2 4-in., 2 3-in. A.A. 12 smaller guns.

Fleet Air Arm Supply and Depot Ship.—Unicorn, projected.

For sloops, minesweepers and river gunboats, see *Flotilla tables*, pp. 279-285.

Defence Forces of the Dominions.

ROYAL AUSTRALIAN NAVY.

Under Control of the Australian Naval Board.

Class.	NAME.	Standard Displacement.	Length. (Extreme.)	Beam. (Extreme.)	Draught.	Horse-Power. Type and Rollers.	Where Built.	Maker of Engines.	Date of Launch.	Date of Completion.	Cost.	Armour.		Armament.		Speed.	Complement (War).
												Belt.	Deck.	Guns.	Torpedo Tubes.		
Kent Class Cruisers	Australia.	9870 tons.	630	68	4	16	3	80,000 B.C. (G.) Y.	Brown	1927	1928	in.	..	8 8-in., 4 4-in. A.A., 4 3-pr., 4 2-pr. Pom	8 21"	31½	685
	Canberra.	9850							Clydebank					12 L., 1 a.w. aircraft, 1 catapult.	2 Q. (Q.)		
Amphion Class	Sydney	6850	530	56	8	15	8	72,000 P.T. (G.)	Wallsend	1934	1935	..	..	18 smaller, 1 catapult, 1 aircraft	21"	32½	590
	Hobart (late Apollo)	6980	b.p.														
Adelaide Type Cruiser	Adelaide	5100	462½	50	1	15	10	25,000 P.T. Y.	Sydney	1918	1922	3	—	9 6-in., 1 3-in. A.A., 4 3-pr., 8 L., 2 M.	2 (sub.) 21"	25.5	450
	Stuart	1530	332½	31	9	12	3	40,000	Hawthorn Leslie	1918	1918	—	—	5 4-7-in., 1 3-in. A.A., 7 M. & L.	6	36½	182

DESTROYERS.—"P" Class :—Vampire, Vendetta, Voyager, Waterhen. Completed, 1917-18; Displacement, 1,090 tons; 27,000 H.P.; speed, 34 knots; armament, four 4-in.; 6 smaller guns, 6 torpedo tubes.

SLOOP.—Yarra (1935). 1060 tons. 2000 H.P. (T.G.). 16½ knots, 3 4-in., 4 3-pr., and Swan, a repeat vessel (1936). Parramatta and Warrego, repeat vessels, building.

SURVEYING VESSEL.—Moresby (late Silvio) (1918). 1650 tons, length 267½ ft., 2,500 H.P., 15 knots, one 3-pr.

DEPOT AND FLEET REPAIR SHIP : Penguin (late Platypus) (J. Brown, Clydebank, 1917). Displacement 3455 tons, 14 knots, 1 4-in.

• Total cost, including guns and aircraft.

NEW ZEALAND DIVISION OF ROYAL NAVY.

Under the control of New Zealand Naval Board.

TRAINING AND DEPOT SHIP.—Philomel (2570 tons); 1 6-in., 1 4-in., 2 12-pr. TRAWLER.—Wakakura.
THE CRUISERS Achilles and Leander and the Sloops Leith and Wellington are allocated to the station.

ROYAL CANADIAN NAVY.

Under control of the Canadian Department of National Defence.

DESTROYERS.—Fraser, ex-Crescent and St. Laurent, ex-Cygnnet taken over by Canada 1936. Built by Vickers 1932; 1375 tons; 36,000 H.P.; 36 knots; armament, 4 4.7 in., 7 smaller guns, 2 Quadruple 21" torpedo tubes. Restigouche (late Comet) and Ottawa (late Crusader) 1375 tons; 36 knots; 4 4.7-in., 6 smaller guns, 8 torpedo tubes. Saguenay and Skeena completed at Thornycroft's in 1931; displacement, 1337 tons; 32,000 H.P.; speed, 35 knots; armament, 4 4.7-in., 2 2-pr., 2 quad, 21-in. torpedo tubes; oil, 440 tons.

GOVERNMENT VESSELS (armed).—A number of trawlers are used for patrol and reserve.

MINESWEEPING TRAWLERS.—Festubert, Ypres, and Armentieres (1918), 360 tons; Comox and Nootka (1938), 692 tons.

SOUTH AFRICA.

[The seagoing force of the South African Naval Service was disbanded in 1934.]

ROYAL INDIAN NAVY.

MINESWEEPING SLOOPS.—Indus (1935, Hawthorn Leslie), 1,190 tons; 2,000 H.P.; 16½ knots; 2 4.7-in., 4 3-pr., 11 smaller guns. Hindustan (1930, Swan Hunter), 1,190 tons; 2,000 H.P.; 16½ knots; 2 4-in., 4 3-pr., 10 smaller guns. Clive, 2,021 tons; 1,700 H.P.; 14½ knots; 2 4-in., 2 2-pr., 4 3-pdr. guns; completed Beardmore, 1920. Lawrence, 1,253 tons; 1,900 H.P.; 15 knots; 2 4-in., 4 3-pdr., 2 2-pdr. guns; launched Beardmore, 1919.

SLOOPS.—Cornwallis, 1,345 tons; 17 knots; 2,500 H.P.; 3 4-in., 2 2-pdr., 4 3-pdr. guns (launched Hamilton, 1917, as the Lychneis).

SURVEYING SHIPS.—Investigator (Vickers, 1907), 1,172 tons; 1,137 H.P.; 13 knots; no guns.

PATROL BOATS.—Pathan (ex P.C. 69), 695 tons; 3,500 H.P., 20 knots, 1 4-in. and 2 12-pdr. guns; completed 1918.

TRAWLER.—Madras.

ARGENTINE REPUBLIC.

Class.	NAME.	Standard Displacement.	Length. (Extreme).	Beam.	Draught.	Horse-Power. Type and Boilers.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour.						Armament.		Speed.	Fuel. Coal. Oil.	Complement.
											Belt.	Deck.	Side above Belt.	Bulkhead.	Heavy Guns.	Gun Position. Second- ary.	Guns.	Torpedo Tubes.			
c.	La Argentina	7000 tons	535 ft.	56 ft.	16 ft.	55,000 P.T. (G.) Y.	Vickers, Barrow	1937	1938	£ ..	in.	in.	in.	in.	in.	in.	9 6-in., 4 4-in. A.A., 25 A.A. M.G., 1 catapult, 2 aircraft. (T.)	6 21*	30 knots	1000 tons	556 +60 Cdls.
c.	Almirante Brown	6495 tons	545 ft.	58 ft.	16 ft.	85,000 Y. (G.)	{ Leghorn Genoa . }	{ 1929 1931 }	{ 1,250,000 1,250,000 }	3	1	..	..	..	2	2	6 7.5-in., 12 4-in. A.A., 6 Pom Poms, 1 catapult, 2 seaplanes. (T.)	6 21*	32 knots	1680 tons	600
c.d.s.	General Belgrano†	6100 tons	328 ft.	59 ft.	24 ft.	13,000 (G.)	Leghorn	1897	1899	696,700	6-3 H.S.	1½	6 H.S.	6 H.S.	6 H.S.	6 H.S.	2 10-in., 8 6-in., 4 6-pr. 2 1.5-in. A.A.	—	20 knots	1000 tons	515
c.d.s.	Pueyrredon †	6100 tons	328 ft.	59 ft.	24 ft.	13,000	Sestri Ponente	1898	1901	782,000	6-3 H.S.	1½	6 H.S.	5 H.S.	6 H.S.	6 H.S.	2 10-in., 8 6-in., 4 6-pr., 1 1-pr. A.A.	—	20 knots	1000 tons	430
b.	{ Moreno . Rivadavia . }	{ 27,940 tons 585 tons }	{ 585 ft. 97 ft. }	{ 28 ft. 28 ft. }	{ 28 ft. 28 ft. }	{ 45,000* (G.) }	{ Camden, N.J. (N.Y.S.B.Co.) Quincy, Mass. }	{ 1911 1915 }	{ 2,200,000 1,914 }	12-10 K.S.	3-2 K.S.	9-6 K.S.	9 K.S.	12-9 K.S.	6 K.S.	12 12-in., 12 6-in., 4 3-pr., 6 M., 4 L.	2 (sub.) 21*	22.5 knots	— 4200 tons	{ 1200 940 }	

The old coast-defence ironclads Libertad and Independencia, 2510 tons, 13 knots, completed at Birkenhead in 1891-93, and converted to oil fuel in 1927, carry two 9.4-in., four 4.7-in., and four 3-pr. guns. The Libertad is used as parent ship for submarines.

River gunboats Paraná and Rosario (Elswick, 1908), 1055 tons, two 6-in. howitzers, six 3-in., 2 L., 15 knots.

The training-ship (cruiser) (Birkenhead, 1896; refitted 1926), Presidente Sarriento, 2320 tons, 15 knots; four 4.7-in., four 6-pr., two 3-pr., 3 torpedo tubes.

Sloops (surveying vessels) Comodoro Rivadavia, ex-San Juan, Bahia Blanca and San Luis (Hawthorn Leslie, Newcastle, 1928), 790 tons, 1-3-in. 12 knots. Alferez Mackinlay (1914), 783 tons, 10 knots.

Tugs, Mataco, Toba (completed 1928, at Messrs. Hawthorn Leslie's, Newcastle), Azapardo (1919), Ona, Querandi (Thornycroft, 1914), and 12 others.

Minesweepers.—Bouchard, Drummond, Granville, Parker, Robinson, Seaver, and Spiro (1937-38); 550 tons; 2000 H.P.; 16 knots; two 3.9-in., two 2.9-in. guns; 6 ex-German Minesweepers; 16 knots; three 3-in. guns.

* Moreno and Rivadavia were converted to oil burning and fitted with geared turbines in 1928. † Converted to oil burning and armament altered in 1929. ‡ Used as training ships.

BRAZIL.

Class.	NAME.	Standard Displacement.	Length. (Extreme).	Beam.	Draft.	Horse-Power. Type of Machinery	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour.					Armament.		Torpedo Tubes.	Speed.	Complement.	
											Belt.	Deck.	Side above Belt.	Bulkheads.	Heavy Guns.	Second-ary.	Guns.			Gun Position.	knots.	tons	Coal	Oil.
b.	Minas Geraes *	19,200	541	83	25	(25,000 B.&W.	Elswick Barrow	1909	1910	£	in.	in.	in.	in.	in.	in.	12 12-in., 14 4-7 in., 4 3-in. A.A.; 4 A.A. M.G. 12 12-in., 12 4-7-in., 6 3-pr., 2 3-in. A.A.; 4 M.	—	21	2360 850	350
b.	São Paulo																				
cr.	†Bahia . .	3150	401½	39	13½	22,000 B.C.T. (G.) Th.	Elswick	1909	1910	..	..	..	..	..	..	..	10 4-7-in., 4 3-pr.	4 21" (D)	27	— 640	450
cr.	†Rio Grande do Sul . .																				

* Fitted with new oil-burning water-tube boilers by Thornycrofts, 1935.

† Reconstructed, including conversion to oil fuel, at Rio de Janeiro, 1926.

RIVER GUNBOAT.—Oyapock, 195 tons, 14 knots, two 3 pr.

MINELAYERS.—Maria do Couto, Heitor Perdigão and Muniz Freire.

RIVER MONITORS.—Pernambuco, 470 tons, 11 knots, built at Rio de Janeiro (1910), two 4-7-in. guns. Parnahyba and Paragassu, 600 tons, 180½ feet in length, 12 knots, one 6-in. gun.

SUBMARINE TENDER.—Ceará (Spezia, 1916), 4000 tons, 4100 H.P., 14 knots, four 4-in. guns.

REPAIR SHIP.—Belmont (ex-German SS, Valesia), 5227 tons gross, four 4-7-in. six 6-pr.

TRAINING SHIP.—Almirante Saldanha, Vickers' (1934). A four-masted schooner, 3325 tons, 305 feet over all, four 4-in. and one 3-in. A.A. guns, one 21-in. torpedo tube.

SURVEY VESSELS.—Rio Branco, 895 tons, 15 knots, two 6-pr. Calheiros da Graca, Vital de Oliveira, Jose Bonifacio, 1,300 tons, 9 knots, two 4-in., two 6-pr., Jacequay, 800 tons, 16 knots.

Tugs, Tenders, Tankers and River Craft.

CHILE.—Armoured Ships.

Class.	NAME.	Standard Displacement.	(Extrm.)	Beam	Draught.	Horse-Power.	Type of Machinery and Boilers.	Where Built.	Date of Launch.	Cost.	Armour.					Armament.		Speed.	Fuel.		
											Belt.	Deck.	Side above Belt.	Bulkhead.	Heavy Guns.	Gun Position	Second-ary.		Guns.	Torpedo Tubes.	tons.	Coal Oil.
b.	Almirante Latorre * (ex-H.M.S. Canada)	28,950	661	92	6 29	0 37,000	P.T.	Elswick	1913	1915	in. 9-4	in. 4-2½	in. 4½	in. ..	in. 10	in. 6	10 14-in., 14 6-in., 4 4-in., A.A., 2 3-in., A.A., 4 3-pr., 1 catapult.	4 (sub.) 21"	23	—	1000
cr.	General O'Higgins	6,977	412	62	9 22	0 16,000	Y.	Elswick	1897	1898	7-5	2	..	..	7½-6	6	4 8-in., 10 6-in., 12 3-in., 4 m.	2 18"	21-5	1200	500
b.	Capitan Prat †	5,416	328	60	9 22	9 12,000	B.	La Seyne	1890	1893	12	3	4	..	10½	2	4 9-4-in. (Canet), 8 4-7-in. (Canet), 8 6-pr., 11 m.	2 18"	18	775	500
			p.p.																	—	—

* Fitted with bulges, converted to oil burning, and modernised in England (completed 1931).

† Submarine parent ship.

Cruisers.

Class	NAME.	Standard Displacement.	Length. (Extreme.)	Beam.	Draught.	Horse-Power.	Where Built.	Date of Launch.	Cost.	Armour.		Armament.		Speed	Coal.	Complement.
		tons.	ft. p.p.	ft. ins.	ft. ins.					Deck.	Gun Position.	Guns.	Torpedo Tubes.	knots.	tons.	
cr.	Blanco Encalada	3435	370	46	6 19	6 14,500	Elswick	1893	1894	in. 4-1½	in. ..	2 8-in., 10 6-in., 4 3-in.	2 18"	22-78	850	385
"	Chacabuco	3417	360	46	6 17	0 15,500	Elswick	1901	1903	4½-1½	..	2 6-in., 10 4-7-in., 4 3-in.	2 18"	24-0	1000	400

OILERS (Armstrongs, 1930): Maipo, 4,686 tons gross; Rancagua, 3,080 tons displacement, two 4-7-in. guns. COASTGUARD VESSELS: (Ormpello, Leucaton, Elicura, 530 tons; built 1919; 14 knots; 2 3-in. guns; Porvenir, 450 tons. Sibald, Yelcho, Micalvi, Condor, and Yanez. SUBMARINE DEPOT SHIP: Aracano (Vickers-Armstrongs, Barrow), completed 1930; displacement 5,890 tons; armament two 4-7-in., two 3-in. A.A.; length b.p. 390ft.; beam 55 ft.; draught 16 ft. 6 ins.; speed 13 knots; H.P. 2,500; 1 seaplane.

TRAINING SHIP.—General Baquedano (1898). 2350 tons, four 4-in. guns, two 3-pr.

Five tugs, 790 tons, 11 knots.

Two towing launches.

DENMARK.

Class.	NAME.	Standard Displacement.	Length. (Extreme.)	Beam.	Draft.	Horse Power.	Where Built.	Date of Launch.	Cost.	Armour.					Armament.		Speed.	Fuel.	
										Belt.	Deck.	Side above Belt.	Bulkhead.	Gun Position.	Guns.	Torpedo Tubes.		Coal.	Oil.
cr.	Niels Juel	tons. 3800	295	45.3	6 15	9	5500	Copenhagen 1918	1923	8-4 K.S.	2	..	..	..	2 K.S.	2 (sub.) 18"	17.0	240 250	365
c.d.s.	Peder Skram	3500	286	7.51	6 16	3	5400	Copenhagen 1908	1909	8-4 K.S.	2	..	..	7 K.S.	2 K.S.	4 (sub.) 18"	16.0	250	275

MINELAYERS.—Løsen 640 tons, 12 knots, 2 3-in., 2 A.A. guns, 175 mines; Sixtus and Kvintus, 186 tons, 8 knots, 2 1-pr, guns, 60 mines; Mining boats 1-10. Mine depot boats, 1-2. Steamboat A. 96 tons, 7 knots, 2 m.g.

MINEWARFERS.—Springer, 110 tons, 24.3 knots, 2 2½-in. guns, 1 torpedo tube.

GUARD SHIPS.—Hvalrossen, 169 tons, 26.3 knots, 1 8-in. gun, 4 18 in. torpedo tubes; Makrelen, Nordkaperen, Havkatten, and Seelen, 110 tons, 24.3 knots, 2 2½-in. guns, 4 18 in. torpedo tubes.

SURVEYING VESSELS.—Hjælmø, 825 tons, 12½ knots, 2 3-in. guns; Ternø, 80 tons.

REPAIR SHIP.—Henrik Germer, 463 tons, 13 knots, 2 3-in., 2 2½-in. guns.

FIRE-PROTECTION VESSELS.—Ingolf, 1180 tons, 16½ knots, 2 4.7 in., 2 2½-in. guns, 1 aircraft; Hvidjorden, 1050 tons, 14½ knots, 2 8½-in. guns; Islands Falk, 730 tons, 13 knots, 2 3-in., 2 1½-in. guns; Beskytteren, 415 tons, 11 knots, 1 2½-in. gun; Maagen, 110 tons, 8 knots, 1 1½-in. gun; Aegir, 500 tons, 14 knots.

DEPOT SHIPS.—Hekla, Grønsund, Fyen. TRANSPORT SHIPS.—Sleipner, 110 tons, 8.7 knots; Midtegrunden, Fremad, Kongedybet. Icebreakers. Cable Ships.

FRANCE.—Battleships.

Class.	NAME.	Standard Displacement.	Length. (Extreme.)	Beam.	Draught.	Horse-Power. Type and Boilers.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour.						Armament.		Speed.	Fuel.	Complement.	
											Belt.	Deck.	Slide above Belt.	Bulkhead.	Gun Position.	Guns.	Torpedo Tubes.					
		tons.	ft. ins.	ft. ins.	ft. ins.					£	In.	In.	In.	In.	Heavy.	Second-ary.	In.	Guns.	knots.	tons.		
b.	Richelieu	35,000	794	0 108	6 26	7	155,000	Brest	1939	Bldg.	9-16	8	..	..	..	..	8	15-in., 15 6-in., 8 1-5-in. A.A., 2 catapults, 4 aircraft.	..	about 31	..	..
b.	Jean Bart																					
b.	Clemenceau																					
b.	Gascogne		W.L.				Brest	Bldg.			..	..	..	..	..	..
b.c.	Strasbourg	26,500	702	0 102	0 25	0	160,000	St. Nazaire	1936	1938	..	..	..	..	..	..	8	13-in., 16 5-1-in., 40 smaller, 1 catapult, 4 aircraft.	..	29½	..	..
b.c.	Dunkerque	26,500	702	0 101	8 27	11	100,000	Brest	1935	1937	5,200,000	10-8	4-9	..	..	..			
b.	Bretagne	22,189	544	6 88	6 32	0 29	000	Brest	1913	1915	2,589,439	11-7	2½-1½	7	10½	K.S.	7	10 13-4-in., 14 5-4-in., 8 3-in. A.A., 5 3-pr., 2 1-pr., 2 L.	4	21-0	—	1167
b.	Condorcet *	17,597	480	11 84	7 27	0 22	500	St. Nazaire	1909	1911	2,165,200	10-8	2½	8½	12	8½	K.S.	4 12-in., 12 9-4-in., 12 3-in., 2 3-in. A.A., 4 3-pr., 2 1-pr., 2 L.	2	19-25	2100	890
b.	Courbet	22,189	551	0 92	6 32	0 28	000	Lorient	1911	1913	2,508,388	11-7	2½-1½	7	10½	K.S.	7	12 12-in., 22 5-4-in., 2 3-pr., 1-pr., 2 L.	4	20-0	—	1140
b.	Océan, ex Jean Bart *	22,189	551	6 92	6 32	6 28	000	Brest	1911	1913	2,528,888	11-7	2½-1½	7	10½	K.S.	7	7 3-in. A.A., 2 1-pr., 2 L.	4	20-0	250	1140
							B.													2700	1140	
							P.T.													300		

* No longer on effective list. Used as training ships.

All the above battleships were reconstructed and modernised between 1923 and 1935. Since 1930 all except Condorcet have been taken in hand for conversion to oil-fuel burning.

FRANCE.—Battleships—continued.

Class.	NAME.	Standard Displacement.	Length. (Extreme.)	Beam.	Draught.	Horse power. Type of Machinery and boilers.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour.						Armament.		Speed.	Fuel.	Complement.
											Belt.	Deck.	Side above Belt.	Bulkhead.	Heavy Guns.	Second-ary.	Guns.	Torpedo Tubes.			
b.	Lorraine	22,189	544	688	6 32	0 42,000	St. Nazaire B.	1913	1916	2,642,439	11-7 K.S.	23-13	7 K.S.	7 K.S.	10½ K.S.	7 K.S.	8 13-4-in., 14 5-4-in., 8 3-9-in. A.A., 5 47mm. A.A., 2 1-pr., 2 L., 2 aircraft, 1 catapult.	4 (sub. 18")	21½	300 2600	1167
b.	Paris	22,189	551	0 92	6 32	6 28,000	La Seyne N.	1912	1914	2,603,920	11-7 K.S.	23-13	7 K.S.	7 K.S.	10½ K.S.	7 K.S.	12 12-in., 22 5-4-in., 4 8-pr., 7 3-in. A.A., 2 1-pr., 2 L.	4 (sub. 18")	20-0	300 2700	1140
b.	Provence	22,189	544	688	6 32	0 29,000	Lorient P.T.	1913	1916	2,589,000	11 7 K.S.	23-13	7 K.S.	7 K.S.	10½ K.S.	7 K.S.	10 13-4-in., 14 5-4-in., 8 3-in. A.A., 5 8-pr., 2 1-pr., 2 L.	4 (sub. 18")	21½	300 2700	1167

All the above battleships were reconstructed and modernised between 1923 and 1935. Since 1930 all except Condorcet have been taken in hand for conversion to oil-fuel burning.

Aircraft Carriers.

Class.	NAME.	Standard Displacement. tons.	Length. (Extreme). ft. ins.	Beam. ft. ins.	Draft. ft. ins.	Horse-power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour.		Armament.		Speed. knots.	Fuel. Coal. Oil.	Complement
											Belt. Deck.	Gun Position.	Guns.	Torpedo Tubes.			
A.C.	Bearn *	22,146	599 0	115 6	30 6	37,200	Chantiers de la Méditerranée, La Seyne	1914	1928	2 ..	in. 3½ 1-3	in. ..	8 6·1-in., 63-in. A.A., 8 1-pr. A.A., 12 M. A.A., 41 planes	4 21·7"	21·5	— 2070	875
Aircraft Trans- port A.C.	Commandant Teste Joffre Painlevé }	10,000	548 0	88 7	22 9	21,000 †	Chantiers de la Gironde, Bordeaux	1929	1932	..	2 1½	..	12 3·9-in. A.A., 8 3-pr. A.A., 12 M., 19 planes, 4 catapults, 5 cranes. 5 1-in. guns.	—	20·5	oil	648
		18,000					Bldg.										

* Originally designed and laid down as a battleship; reconditioned 1935.

† Schneider-Zoelly turbines (G.). Yarrow-Loire S.T. boilers.

FRANCE.—Cruisers.

Class.	NAME.	Standard Displacement.	Length. (Extreme.)	Beam.	Draught.	Horse-Power.	Type of Machinery.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour.		Armament.		Speed.	Fuel.	Complement.
												Belt.	Gun Position.	Guns.	Torpedo Tubes.			
Training cruiser	Jeanne d'Arc	6495 tons.	557 ft. 8 in.	57 ft. 6 in.	18 ft. 8 in.	32,500		Penhoet Yard, St. Nazaire	1930	1931	£ ..	in. ..	in. ..	8 6-1-in., 4 3-in. A.A., 2 1-6-in., 2 m., 2 seaplanes	2 21-7"	2	tons. ..	506
	Jean-de-Vienne	7600	587	57	16	84,000	G.T.	Lorient.	1933	1936	..	4 3	Deck 1 1/2	9 6-in., 8 3-5-in. A.A., 8 1-pr., 1 catapult, 4 air-craft	4 21"	4	—	537
	La Galissonnière	8000	Brest	Bldg.	6-in. guns	1500	..
Improved La Galissonnière	De Grasse	8000	Brest	Bldg.
	Chateaurenault																	
	Guichen																	
1932-33 programme	Marseillaise	7600	587	57	4	17	5	Ch. de la Loire, St. Nazaire	1935	1937	..	4 3	Deck 1 1/2	9 6-in., 8 3-5-in. A.A., 8 1-pr., 1 catapult	4 21"	4	—	630
	Gloire																	
	Montcalm																	
—	Georges Leygues	10,000	610	65	8	23	0	Brest	1932	1934	1,920,000	about 4	Deck 3	8 8-in., 12 3-9-in. A.A., 8 1-pr., 16 m., 2 catapults, 2 seaplanes	2 21"	2	—	746
	Algérie																	
	Dupleix																	
Suffren Class	Foch	10,000	636	6	63	6	24	Brest	1929	1931	1,450,000	8 8-in., 8 3-5-in. A.A., 6 1-pr. A.A., 12 m., 3 seaplanes, 2 catapults.	2 21"	2	—	605
	Colbert																	
	Suffren																	
Duquesne Class	Tourville	10,000	626	8	62	4	23	Lorient.	1926	1928	8 8-in., 8 3-in. A.A., 8 1-pr. A.A., 12 m., 3 seaplanes, 2 catapults	2 21"	2	—	620
	Duquesne																	

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GERMANY.—Battleships.

Class.	NAME.	Normal Displacement.	Length. (Extreme.)	Beam.	Draught.	Horse-Power.	Type of Machinery and Boilers.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour.					Armament.		Speed.	Coal. Oil.	Complement.	
												Belt.	Deck.	Slide above Belt.	Bulkhead.	Gun Position. Heavy Guns.	Second-ary.	Guns.				Torpedo Tubes.
b.	Bismarck .	35,000	792 4 118 0	26 0	0	..	..	Hamburg	1939	..	£	in.	in.	in.	in.	in.	..	8 15-in., 12 5-9-in.	..	28	..	..
b.	Battleship "G"							Wilhelms-haven	1936					
b.	Scharnhorst	26,000 (stan-dard)	741 6 98 6	24 8	..	..	..	Wilhelms-haven	1936	1939	..	..	..	..	..	..	9 11-in., 12 5-9-in., 12 4-1-in. A.A., 2 aircraft.	..	27	..	..
b.	Gneisenau							Kiel	1936	1938
b.*.	Deutschland .	10,000 (stan-dard)	609 3 67 0	6 19 0	54,000 -56,800 Diesel †	..	..	(Deutsche Werke, Kiel)	1931	1933	3,750,000	about 4	1 1/2-3	—	—	about 7	—	6 11-in., 8 5-9-in., 6 4-1-in. A.A., 8 3-pr., 10 m., 1 catapult, 2 aircraft.	8 21" (Q.)	26	— 1200	965
b.*.	Admiral Scheer							Wilhelms-haven	1933	1934	3,580,000	estimated					
b.*.	Admiral Graf Spee	12,988	413 5 72 10	25 3	16,000 recip. T.S.	..	..	Wilhelms-haven	1934	1936	3,530,000	estimated	..	..	..	..	..	..	..	18	1574 197	..
b.	Hessen § .							Kiel (Ger-mania)	1903	1905	1,157,500	9-4 K.S.	3	6 K.S.	6 K.S.	10-6 K.S.	6 K.S.					
b.	Schlesien † .	12,300	419 0 72 10	25 3	17,000 recip. T.S.	..	..	(Schichau)	1906	1908	1,214,000	9 1/2-4 K.S.	3	8 K.S.	6 K.S.	11-6 K.S.	6 1/2 K.S.	4 11-in., 10 5-9-in., 4 8-5-in. A.A., 23 m.	..	18	1771 197	727
b.	Schleswig-Holstein †							(Germania)	1906	1908	1,214,000					
A. C.	Graf Zeppelin	19,250	820 3 88 6	18 4	..	..	..	(Deutsche Werke)	1938	..	..	..	..	..	..	..	..	16 5-9-in., 10 4-in., H.A. 22 smaller.	..	about 32	..	..
"B"	"B"							(Germania Werft Bldg.)					

AIRCRAFT CARRIERS.

* Officially rated as "Armoured Ships."

† Reconstructed 1925-30.

§ Is now a target vessel.

‡ Consists of eight double acting two-stroke M.A.N. Diesels.

GERMANY.—Cruisers.

Class.	NAME.	Standard Displacement.	Length. (Extreme.)	Beam. (Extreme.)	Draught.	Horse-Power. Type of Machinery and Boilers.	Where Built.	Maker of Engines.	Date of Launch.	Date of Completion.	Cost.	Armour.	Armament.	Speed.	Fuel.	Complement.
		tons.	ft.	ins. ft.	ins.	(G.)					£	Belt.	Gun.	Torpedo Tubes.	tons.	
cr.	Blücher	10,000	639	9	69	11	5	(G.)	Deutsche Werke Blohm and Voss	..	{ 1937 Bldg. 1937 Bldg.	in.	{ 8 8-in., 12 4 1-in., 12 2 1-in. 8 8-in., 12 4 1-in., 12 2 1-in.	32	..	..
cr.	Admiral Hipper.	10,000	653	0	71	3	15	(G.)	Germania Werft Deschimag Deschimag	..	Bldg.	..	12 smaller 8-in.	32	..	..
cr.	Prinz Eugen	10,000	..	..	..	..	..	..	..	..	..	..	8-in.	32	..	..
cr.	K.	7000	..	..	..	..	..	..	..	..	..	..	5 9-in.	..	..	..
cr.	L.	..	..	..	..	..	..	..	..	..	..	..	5 9-in.	..	..	..
cr.	Two others	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
cr.	M.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
cr.	N.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
l.c.	Leipzig	6000	580	0	53	5	15	72,000† (geared turbines 60,000, Diesels 12,000)	Wilhelmshaven	Kiel	1929	1931	2,050,000	3-4	..	..
l.c.	Nürnberg	6000	580	0	53	5	14	3	72,000	Kiel	1934	1935	..	..	..	..
l.c.	Köln	6000	570	10	49	10	17	8	65,000†	Wilhelmshaven	1928	1930	1,785,000	..	..	..
l.c.	Karlsruhe	6000	570	10	49	10	17	8	65,000†	Deutsche Werke, Kiel	1927	1929	1,985,000	3-4	..	..
l.c.	Königsberg	5400	510	2	46	11	17	4	46,500 (G.)	Wilhelmshaven	1927	1929	2,100,000	..	..	..
l.c.	Emden *	5400	510	2	46	11	17	4	46,500 (G.)	Wilhelmshaven	1925	1925	..	3	..	..

* Training Ship.

† Three propeller shafts, of which the centre shaft is Diesel-driven and the outers turbine-driven. Diesels used for cruising or combined with the turbines to give full speed.

‡ Parsons geared turbines with Diesels for cruising.

GERMANY.—Cruisers.—*continued.*

- ESCORT VESSELS.—10 (1936), 600 tons, 240 feet, 2 4-1-in. 4 1-pr., complement 103. 15 patrol vessels building, 1 m.g. 2-20 in. T.T.
- GUNNERY TRAINING SHIPS.—*Drache* (1908), 790 tons, 15 knots, 4 4-1-in.; *Fuchs* (1919), 525 tons, 16 knots, 2 4-1-in. Guntery Tenders *Bremse* (Wilhelmshaven, 1932), 1,250 tons, 339½ feet long, 31 ft. 2 in. beam, 25,000 H.P. (Diesel), 27 knots, 4 4-1-in. guns, complement 162. *Brummer* (1936), 2,410 tons, 20 knots 4 4-in. guns.
- FISHERY PROTECTION VESSELS.—*Weeser* and *Elbe* (Wilhelmshaven, 1931), 590 tons, 1600 H.P. (Diesel), 15 knots.
- EXPERIMENTAL VESSELS.—*Pelican* and *Nautilus* (500 tons, 17 knots); *Strahl*, 1643 tons, 10 knots.
- MOTOR TORPEDO BOATS.—S 6 (1932), 46 tons, 2,400 B.H.P., 31-32 knots, 1 m.g. A.A., 2 19-7-in. T.T.; S 7-19 (1934-38), and S 20-25 (building), 70 tons, 1 m.g. A.A., 2 19-7-in. T.T.
- GUARD SHIPS.—UZ (S) 8, UZ 32, 33, 60 tons, 14 knots.
- TENDERS.—*Hela*, *Frauenlob*, 525 tons, 16 knots. *Nordsee*, 830 tons, 12 knots. *Taucher*, 202 tons, 6-6 knots.
- SAILING TRAINING SHIPS.—*Gorch Fock* (Hamburg, 1933). Three-masted barque, 239 feet in length, 1,500 tons, 500 H.P. auxiliary motor giving 8 knots. *Horst Wessel* (1936), and *Leo Schlageter* (1938), 1,634 tons, 295 ft. 3 in. in length, 35 ft. 4 in. beam, 15 ft. 9 in. draught, 750 H.P., auxiliary motor giving 10 knots, complement 289.
- BARRAGE CRAFT.—R 1-16 (1933-4), 85 ft., 44 tons, 700 H.P., 17½ knots, 1 1-pr. gun. R 17-20 (1935), R 21-25 (1938), R 26-30 building, 90 tons. Mining and Barrage vessels MT 1 and 2, 550 tons, 10 knots; 8 small craft (1906-15), 70 tons, 9 knots; I-IV (1936), 120 tons.
- TARGET SHIPS.—*Zähringen* (ex-battleship), 11,800 tons, 13 knots. *Hessen*. Wireless controlled.
- TARGET TUGS AND CONTROL SHIPS.—*Pfeil*, *Komet*, and *Blitz*, 650 tons. 30 knots *ex* T.B.'s. *Blitz* is control ship for *Zähringen*.
- DEPOT SHIPS.—*Teington* (1934), 1,970 tons, 17½ knots, 2 3-5-in., 4 m.g. *Saar* (1934), 2,710 tons, 16 knots, 3 4-1-in., 4 m.g. *Weichsel* (1923), 3,950 tons, 10½ knots. *Donau*, 10 knots. *Zieten* (1919), 550 tons, 14 knots, 1 4-in., 2 m.g. Two in number building and 4 projected.
- TORPEDO RECOVERY VESSEL.—*Orkan* (1916), 470 tons, 10 knots.
- PARENT SHIPS.—*Zieteh* (1919), 541 tons, 17 knots, 1 4-1-in. gun.
- SURVEYING VESSELS.—*Meteor* (1924), 1,150 tons, 14 knots, one 3-4-in. Two surveying launches, 90 tons.
- MINESWEEPERS.—26 in number (1917-1919), 475-525 tons, 1,800 H.P., 16 knots, 1 4-1-in. gun. M 1-24, 600 tons, 2 4-1-in. guns, 1 1-pr.; M 13-24, 600 tons, 2 4-1-in., 1 1-pr. (building).
- OTHERS.—*Samland*, 10,111 tons; *Brosen*, 2,498 tons, 8 knots; *Wollin*, 3,429 tons, 9½ knots; *Norderney*, 1,110 tons, 7 knots.

GREECE.

Class.	NAME.	Standard Displacement.	Length. (Extreme.)	Beam.	Traught.	Horse-Power. Type of Machinery and Boilers.	Where Built.	Date of Launch.	Cost.	Armour.						Armament.		Speed.	Coal. Oil.	Complement	
		tons.	ft.	ft.	ft.					Belt.	Deck.	Side above Belt.	Bulkhead.	Heavy Guns.	Second-ary.	Guns.	Torpedo Tubes.				
cr.	Giorgios Averoff *	9301 462	462	69	24 $\frac{3}{4}$	19,000 (21,500 <i>t</i>) B.	Leghorn (Orlando)	1910 1911	£ 1,100,000	in. 8-3 $\frac{1}{2}$ K.S.	in. 1 $\frac{1}{2}$	in. 7	in. 7	in. 8-6 $\frac{1}{2}$	in. 7		4 9-2-in., 8 7-5-in., 16 3-in., 4 3-pr., 2 3-in. A.A., 2 M. 18-in.	3 (sub.) 18-in.	knots. 22 $\frac{1}{2}$ (24 <i>t</i>). †	tons. 1500 —	620
cr.	Helle † (ex Fei-Hung)	2088 322	322	39	14	6000 P.T. (G.)	Camden, N.J.	1912 1913	240,000	..	1 $\frac{1}{2}$	..	..	..	..	..	3 6-in., 1 3-in. A.A., mines	2 a.w. 18-in.	20 †	600 100	230

* Retubed and refitted 1927. † Repaired and converted to oil burning in France and fitted as a minelayer in 1929. ‡ Probable speed 15 knots.
 Training ship, Ares, 1,870 tons, 11 knots, four 3-in. guns, completed at Chantiers de la Méditerranée, la Seyne, 1929. Repair ship, Hephestos (1920), 4,549 tons gross, 11 1/2 knots, four 4-in. A.A. Surveying ship (old sloop), Nautilus, 400 tons, 11 knots, two 3-in. guns. Dispatch vessels, Korglia Lenios (1916), 380 tons, 13 1/2 knots, and Kichli (1884) 86 tons, 10 knots, one 3 in. C.M.B.'s, two Thornycroft type, 55 *ft*., 37 knots, two Lewis guns 2 *ft*. 4 built at Venice, 69 *ft*., for Customs Service.

WATER CARRIER.—Avra, 1,221 tons, 12 knots.

DEPOT SHIPS.—Amphriti, 1,472 tons gross, 13 knots. Hephestos, 4,549 B.R.T., 11 1/2 knots.

MINELAYERS.—Korgialenios, 380 tons, 13 knots, 50 mines. Tenedos, 450 tons, 13 knots, 40 mines.

ITALY.—Battleships.

Class.	NAME.	Standard Displacement.	Length. (Extreme.)	Beam.	Draught.	Horse-Power. Type of Machinery and Boilers.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour.						Armament.		Speed.	Fuel. Coal. Oil.	Complement.
											Belt.	Deck.	Side above Belt.	Bulkhead.	Heavy Guns.	Second-ary.	Guns.	Torpedo Tubes.			
b.	Roma . . .	35,000	..	..	ft.	..	..	Bdg.	..	£	in.	in.	in.	in.	in.	..	9 15-in., 12 6-in., 12 3.5-in. A.A., 2 catapults, 4 aircraft.	..	31	..	1600
b.	Impero . . .	..	..	..	..	..	..	..	..	..	10	..	..	..	..	..	13 12-in., 16 5-in., 13 8-in., 6 3-in. A.A., 2 2-pr., 6 M., 4 L., 1 catapult, 1 aircraft	2 (sub.) 18-in.	21	1200 800	1074
b.	Littorio . . .	35,000	774 0	103 8	28	150,000 (G.T.)	Genoa (Ansaldo) Trieste	1937	..	..	10-4	1½	6	..	9½	6	..	..	27	2000	1200
b.	Vittorio Veneto	..	..	..	..	..	..	..	..	..	10-4½	1½	6	..	9½	5	10 12-6-in., 12 4-7-in., 8 3-9-in. A.A., 20 A.A., 2 catapults, 4 aircraft.	..	27	2000	1200
b.	Andrea Doria†	23,622	575 9	92 0	29	34,000 P.T. Y.	Spezia	1913	1916	..	10-4	1½	6	..	9½	6	..	..	27	2000	1200
b.	Caio Duilio† . .	..	..	..	..	31,000 P.T. Y.	Castellam-mare	1913	1915	..	10-4½	1½	6	..	9½	5	..	..	27	2000	1200
b.	Conte di Cavour	23,622	629 0	92 0	29	..	Spezia	1911	1915	..	10-4½	1½	6	..	9½	5	..	..	27	2000	1200
b.	Giulio Cesare	23,622	629 0	92 0	29	..	Genoa (Ansaldo)	1911	1914	..	10-4½	1½	6	..	9½	5	..	..	27	2000	1200
§	San Giorgio	9232	462 2	69 0	24½	18,000 recip. Bl.	Castellam-mare	1908	{1910 1911}	..	8-3	1½	7	7	7-6	7	4 10-in., 8 7-5-in., 10 3-in., 6 3-in. A.A., 2 3-pr., 6 M., 2 L.	2 (sub.) 18-in.	{22 32½}	1556 115 1550	689
§	San Marco **	8600	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..

† Undergoing reconstruction as Conte di Cavour.

§ Armoured Cruisers, classified as Battleships, 2nd class, in Italian Official Lists. ** Converted into target ship under wireless control. Armament removed.

ITALY.—Cruisers, &c.

Class.	NAME.	Standard Displacement.	Length. (Extreme.)	Beam.	Draft.	Horse-Power. Type of Machinery.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour.		Armament.	Speed.	Fuel. Coal. Oil.	Complement.
											Side. Deck.	Gun Position.				
Improved Condottieri Class	Duca degli Abruzzi	7874	613 9	61 0	17	100,000 (G.)	(Odero-Terni, Or- lando Spezia.	1935	1936	..	in.	in.	10 6-in., 8 3.9-in., 8 1.5-in. A.A., 8 M., 4 aircraft, 2 catapults. Fitted for mine- laying.	35	1200	600
	Guiseppo Garibaldi	7283	610 3	57 4	16 4	110,000 tur.	(Cantieri Rinniti dell' Adriatico, Trieste Ansaldo, Genoa	1935	1936	..	Abt. 6	..	8 6-in., 6 3.9 in., 8 1-pr. A.A., 8 M., 1 catapult, 3 aircraft. 8 6-in., 6 3.9-in. A.A., 8 1.5-in. A.A., 8.5-in. M., 2 aircraft, 1 catapult. Fitted for minelaying.	36½	1200	550
	Eugenio di Savoia Filiberto Duca d'Aosta	6941	597 9	54 6	14.2	108,000 P.T.	(Orlando, Leghorn) Ansaldo, Genoa Trieste	1934	1935	..	..	..	8 6-in., 6 3.9-in. A.A., 8 1.5-in. A.A., 8.5-in. M., 2 aircraft, 1 catapult. Fitted for minelaying.	37	oil	520
Modified Trento Class	Bolzano.	10,000	646 3	67 8	18 0	150,000	Ansaldo, Genoa	1932	1933	..	Abt. 3	..	8 8-in., 16 3.9-in. A.A., 8 1.5-in. A.A., 1 catapult, 2 seaplanes.	36	oil	720
	Armando Diaz	5008	554 6	50 10	14	95,000 (G.)	(Odero-Terni, Spe- zia Stabilimento Tec- nico Triestino, Trieste	1931	1933	..	2 2	..	8 6-in., 6 3.9-in. A.A., 8 1.5-in. A.A., 8.5 M., 1 catapult, 2 seaplanes.	37 (39½ t.)	1000	530
Zara Class	Pola	10,000	599 9	67 7	19 6	95,000 (G.)	(Odero-Terni, Or- lando Spezia	1931	1932	..	Abt. 6 2	..	8 8-in., 12 3.9-in. A.A., 8 1.5-in. A.A., 8.5-in. M. A.A., 1 cata- pult, 2 seaplanes.	32	2200	800
	Gorizia	5069	555 5	50 10	14.2	95,000 (G.)	(Stabilimento Tec- nico Triestino, Trieste	1930	1931	..	..	..	8 6-in., 6 3.9-in. A.A., 8 1.5-in. A.A., 8.5 M., 1 catapult, 2 seaplanes. Fitted for mine- laying.	37	1200	500
Condot- tieri Class	Alberto di Gius- sano	5069	555 5	50 10	14.2	95,000 (G.)	(Ansaldo, Sestri- Ponente	1930	1931	..	..	..	8 6-in., 6 3.9-in. A.A., 8 1.5-in. A.A., 8.5 M., 1 catapult, 2 seaplanes. Fitted for mine- laying.	37	1200	500
	Albertico da Bar- biano	5069	555 5	50 10	14.2	95,000 (G.)	(Ansaldo, Sestri- Ponente	1930	1931	..	..	..	8 6-in., 6 3.9-in. A.A., 8 1.5-in. A.A., 8.5 M., 1 catapult, 2 seaplanes. Fitted for mine- laying.	37	1200	500
Condot- tieri Class	Bartolomeo Col- leoni	5069	555 5	50 10	14.2	95,000 (G.)	(Ansaldo, Sestri- Ponente	1930	1931	..	..	..	8 6-in., 6 3.9-in. A.A., 8 1.5-in. A.A., 8.5 M., 1 catapult, 2 seaplanes. Fitted for mine- laying.	37	1200	500
	Giov. delle Bande Nere	5069	555 5	50 10	14.2	95,000 (G.)	(Ansaldo, Sestri- Ponente	1930	1931	..	..	..	8 6-in., 6 3.9-in. A.A., 8 1.5-in. A.A., 8.5 M., 1 catapult, 2 seaplanes. Fitted for mine- laying.	37	1200	500
Condot- tieri Class	Giov. delle Bande Nere	5069	555 5	50 10	14.2	95,000 (G.)	(Ansaldo, Sestri- Ponente	1930	1931	..	..	..	8 6-in., 6 3.9-in. A.A., 8 1.5-in. A.A., 8.5 M., 1 catapult, 2 seaplanes. Fitted for mine- laying.	37	1200	500
	Giov. delle Bande Nere	5069	555 5	50 10	14.2	95,000 (G.)	(Ansaldo, Sestri- Ponente	1930	1931	..	..	..	8 6-in., 6 3.9-in. A.A., 8 1.5-in. A.A., 8.5 M., 1 catapult, 2 seaplanes. Fitted for mine- laying.	37	1200	500

ITALY.—Cruisers, &c.—continued.

Class.	NAME.	Standard Displacement.	Length. (Extreme.)	Beam.	Draft.	Horse-Power. Type of Machinery and Boilers.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour.		Armament.		Speed.	Fuel.			Complement.
											Side Deck.	Gun Position.	Guns.	Torpedo Tubes.		Coal.	Oil.		
Trento Class	Trieste †	10,000	645 0	67 9	18	15,000 (G.)	Orlando, Leghorn	1926†	1929	£ ..	In.	in.	{ 8 8-in., 12 8-9-in. A.A., 4 1-57-in., 8 5-in. A.A. M., (D.) 1 catapult, 2 seaplanes.	{ 8 a.w. 21" 2 19.7"	knots. 35	tons.	—	1000	
	Trento . . .						2½ 2	..			..	..				3000	800	
l. c.	Bari (ex-German Pillau)	3248	443 11	44 7	13½	28,000 tur.	Danzig (Schichau).	1914	1915	..	3 1½-3	1	8 5-9-in., 3 3-in. A.A., 3 M., 120 mines. 2 aircraft.	2 19.7"	27.5	984	250	372	
l. cr. †	Quarto	2903	431 9	42 2	13½	29,000 P.T.	Venice . . .	1911	1912	..	1½-3	..	6 4-7-in., 4 3-in., 2 1-57-in. A.A., 3 M., 126 mines	2 18"	28	49	482	256	
l. cr.	Taranto (ex-German Strassburg)	3184	455 0	42 2	12½	27,000 Bl. P.T.	Wilhelmshaven	1911	1914	416,340	4-2½ 2	2	7 5-9-in., 2 3-in. A.A., 3 M., 120 mines	2 19.7"	21	1200	130	373	
s.c.	Miraglia *	4882	397 0	49 8	17	12,000 T.S. P.T.	Spezia . . .	1923	1927	..	..	..	4 4-in. A.A., 4 M., 2 catapults, 16 planes	—	21.5	—	—	300
l. c.	Cornelio Silla Paolo Emilio Attilio Regold Scipione Africano Caio Mario Claudio Tiberio Pompeo Magno Ottaviano Augusto Ulpio Traiano Claudio Druso Vipsanio Agrippa Giulio Germanico	3500	..	..	..	..	..	Projected	..	..	..	..	5-2-in.	..	..	..	..	..

* Ex-merchant ship, taken over on the stocks. Aircraft transport.

† Classified as Scouts in Italian Lists.

‡ Fleet Flagship.

COMBINED MINELAYERS AND MINESWEEPERS.—Fasana, Buccari, Durazzo, and Pelagosa, completed 1926, 531 tons, 10 knots (I.C. machinery), 1 3-in. gun; 54 mines; Azio, Legnano, Lepanto, and Ostia, completed 1926-7, 615 tons, 15 knots (recip.), 2 4-in., 1 3-in., 80 mines. Cotrone, Viesi, 459 tons, 195 ft, 1,600 H.P., 14 knots, 2 4-in. guns.

MINELAYERS.—Laura, Rovigno, and Albona (ex-Austrian), 112 tons, 11 knots, 1 3-in. MINESWEEPERS.—38 in number, 200 tons, 14 knots, 1 3-in. gun, 4 in No., 620 tons, 138 ft., 9 knots, 2 3-in. guns. G. Biglieri, G. Berta, P. Matteucci, M. Sonzini (1924), 620 tons, 9 knots, 2 3-in.

OIL TRANSPORTS.—Tarsvisio, 10,910 tons, 11 knots, 4 4-7-in. 2 3-in.; Stige, 1,342 tons, 8 knots, 1 4-7-in., 1 3-in.; Urano, 10,550 tons, 11 knots, 2 4-7-in., 2 3-in.; Brennero, 9,800 tons, 11 knots, 4 4-7-in., 2 3-in. (fitted with water protection); Prometeo, 1,080 tons, 11 knots, 2 3-in.; Nettuno, Giove, 9,555 tons, 14 knots, 3 4-7-in., 2 3-in.; Niobe, 3,160 tons, 11 knots, 3 3-in.; Cocito, Lete, 1,162 tons, 10 knots, 3 3-in., Cerere, 2,530 tons, 10 knots, 1 4-7-in., 2 3-in.; Bronte, 8,240 tons, 14½ knots, 2 3-in.; Marte, 10 knots, 2 3-in.

RIVER GUNBOATS.—S. Caboto (1912), 778 tons, 13 knots, 6 3-in. guns; E. Carlotto (1918), 180 tons, 14 knots, 2 3-in. A.A. guns. ESCORT GUNBOATS.—A. Badfio, T. Farinati, E. Giovannini, C. del Greco, and A. Vitturi (1922), 182 tons, 23 knots, 2 4-in. guns, 2 T.T. SURVEYING VESSELS.—Ammiraglio Magnaghi (1914), 1,506 tons, 14 knots, 4 3-in.; Cariddi (1916), 330 tons, 10 knots, 1 3-in. gun; Cherso, 3,958 tons, 10½ knots, 4 4-7-in. guns. PATROL VESSELS.—Cirene (1912), 384 tons, 10 knots, 2 3-in.; Corsini (1912), 290 tons, 12 knots, 2 3-in.; Rimini (1912), 319 tons, 9½ knots, 1 3-in. gun; Gallipoli (1911), 310 tons, 10½ knots, 2 3-in. guns; Otranto (1911), 290 tons, 10 knots, 2 3-in. guns; Alula (1912), 308 tons, 13 knots, 1 3-in. gun; Valdroso (1913), 340 tons, 10 knots, 1 3-in.; Palmaiola (1902), 472 tons, 8½ knots, 1 3-in.; Aurora, 935 tons, 14½ knots, 2 2½-in. TRAINING SHIPS.—Cristoforo Colombo (Castellamare, 1928), 2,787 tons, 10 knots (Diesel-electric) 4 3-in. guns; Amerigo Vespucci (Castellamare, 1931), 3,543 tons, 1,800 H.P. (Diesel-electric), 11 knots, 4 3-in. A.A.

SUBMARINE DEFÜR SHIPS (Sloops).—Volta and Pacinotti (1924), 1,730 tons, 19 knots, 4 3-in. A.A. SUBMARINE DEFÜR SHIPS (Sloops).—Volta and Pacinotti (1924), 1,730 tons, 19 knots, 4 3-in. A.A. CABLE SHIPS.—Citta di Milano (5,300 tons), 10 knots. Giasone, 1,192 tons, 250 ft., 15 knots. One submarine chaser, Albatros (1934), 339 tons, 24½ knots, 2 4-in., 4 15-in. A.A., 2 18-in. T.T. (fitted with depth-charge gear).

TUGS.—65 in number. WATER CARRIERS.—Dalmazia, Istria, 2,900 tons, 10 knots, 1 4-7-in., 1 3-in.; Flegelonte, 1,162 tons, 9 knots, 3 3-in. A.A.; Verde, Pagano, 1,432 tons, 9 knots, 1 4-7-in., 1 3-in. A.A.; Teino, 9½ knots, 2 3-in.; Isonzo, Po, Volturmo, 11½ knots, 2 4-in., 4 m.g.; Servia, Tiro, 9½ knots, 4 m.g.

MOTOR TORPEDO BOATS.—M.A.S. 96, 188, 204, 210, 212, 213, 216, 222, 228, 230 (1916-1919), 12 tons, 24-26 knots, 2 18-in. T.T.; M.A.S. 418, 422 (1922), 21 tons, 28 knots, 2 18-in. T.T.; M.A.S. 423-437, 15 tons, 45 knots, 2 18-in. T.T., 5 depth charges; M.A.S. 438-441, 35½ tons; M.A.S. 501-516, 47 knots, 2 18-in. T.T., 6 depth charges; 20 others. TRANSPORT SHIPS.—Lussim, Ghera, 3,988 tons, 10½ knots, 4 4-7-in., 2 3-in.; Tripoli, 2,460 tons, 8½ knots; Panigaglia, Vallerunga, Buffoluto (Ammunition transport ships), 916 tons, 11 knots, 2 3-9-in.; Valgrubba, 8,720 tons, 8 knots; Enrichetta, 8,360 tons, 9½ knots.

LIGHTHOUSE TENDERS.—Lante, 295 tons, 12 knots, 2 3-in.; Bianco, 258 tons, 11½ knots, 2 3-in.; Lutti, 266 tons, 12 knots, 1 3-in.; Levanzo, 226 tons, 11 knots, 2 3-in.; Scilla, 350 tons, 9 knots, 1 3-in.; Lido, 226 tons, 12 knots, 1 3-in.

MONITORS.—Faa di Bruno (1917), 2,790 tons, 3-3 knots, 2 15-in., 6 3-in.; Monte Grappa, Montello (1919), 605 tons, 7 knots, 1 12-in., 2 3-in.; Monte Cengio, Monte Noveano (1919), 502 tons, 7 knots, 1 12-in., 2 3-in.

TARGET SHIP.—San Marco, Old Cruiser.

JAPAN.—Battleships.

Type.	NAME.	Standard Displacement.	Length. (Extreme.)	Beam.	Draught.	Horse-Power. Type and Boilers.	Where Built.	Date of Launch.	Cost.	Armour.					Armament.		Speed.	Fuel.	Complement.	
										Belt.	Deck.	Side above Belt.	Bulkhead.	Gun Position. Heavy Guns.	Second-ary.	Guns.				Torpedo Tubes.
Fuso Class	Fuso §	29,330 tons.	673 ft.	94 ft.	28 ft.	60,000 B.C.T.	Kure	1914	1915	in.	3	in.	in.	in.	12 in.	12 14-in., 16 6-in., 8 5-in. A.A., 4 M., 4 L., 3 sea-planes, 1 catapult.	2 (sub.) 21-in.	knots. 22.5	4500 tons. 1300	1300
	Hyuga *	29,990	683	94	28	84,500 tur.	Nagasaki (Mitsubishi)	1917	1918	12.4 K.S.	8 K.S.	8 K.S.	..	12 K.S.	6 K.S.	12 14-in., 18 5.5-in., 4 3-in. A.A., 2 M. H.A., 2 sea-planes, 1 catapult.	6 (sub.) 21-in. (D)	23	4500 tons. 1300	1360
	Ise *	29,990	683	94	28	84,500 B.C. tur.	Kobe (Kawasaki)	1916	1917	12 K.S.	3	8 K.S.	..	12 K.S.	6 K.S.	12 14-in., 18 5.5-in., 8 5-in. A.A., 2 M. H.A., 2 sea-planes, 1 catapult.	6 (sub.) 21-in. (D)	23	4500 tons. 1300	1360
	Yamashiro §	29,330	673	94	28	60,000 B.C.T.	Yokosuka	1915	1917	12 K.S.	3	8 K.S.	..	12 K.S.	6 K.S.	12 14-in., 16 6-in., 8 5-in. A.A., 4 M., 4 L., 3 sea-planes, 1 catapult.	6 (sub.) 21-in. (D)	22.5	4000 tons. 1300	1272
Kongo Class	Haruna §	29,330	704	95	27	66,000 P.T.	Kobe (Kawasaki)	1913	1915	..	..	..	..	12 K.S.	6 K.S.	12 14-in., 16 6-in., 8 5-in. A.A., 4 M., 4 L., 3 sea-planes, 1 catapult.	6 (sub.) 21-in. (D)	26	—	1250
	Kirishima **	29,330	704	92	27	66,000 P.T.	Nagasaki (Mitsubishi)	1913	1915	8-3 K.S.	2½	6	..	10 K.S.	6 K.S.	8 14-in., 16 6-in., 8 5-in. A.A., 4 M., 4 L., 3 sea-planes, 1 catapult.	4 (sub.) 21-in.	23	1600 tons. 3400	1804 1867 (as fleet flag-ship)
Nagato Class	Kongo †	29,330	704	92	27	66,000 P.T.	Barrow	1912	1913, 2,500,000	..	..	..	..	12-9 K.S.	14	8 16-in., 20 5.5-in., 8 5-in. A.A., 3 M., 3 sea-planes, 1 catapult.	4 (sub.) 21-in.	23	1600 tons. 3400	1804 1867 (as fleet flag-ship)
	Mutsu * Nagato †	32,720	700	95	30	80,000 (G.)	Yokosuka (Kure)	1920 1919	1921 1920	12-9 K.S.	3½	..	..	14	..	8 16-in., 20 5.5-in., 8 5-in. A.A., 3 M., 3 sea-planes, 1 catapult.	4 (sub.) 21-in.	23	1600 tons. 3400	1804 1867 (as fleet flag-ship)

NEW CONSTRUCTION. The number of battleships building in Japan is not known.

ARMOURD CRUISERS now rated as (OAST-DEFENSE SHIPS (1st class), completed 1899-1904: Kasuga, 7080 tons, 20 knots, 1 10-in., 2 8-in., 14 6-in.; Yakumo, 9010 tons, 16 knots, 4 8-in., 12 6-in., 5 3-in.; Adzuma, 8640 tons, 16 knots, 4 8-in., 12 6-in., 5 3-in.; Idzumo and Iwate, 9180 tons, 12 knots, 20 4-in., 14 6-in., 5 3-in.; Asama, 9240 tons, 21½ knots, 4 8-in., 12 6-in., 5 3-in.; Tanahima (2nd class), 3120 tons, 20 knots, 6 6-in., 8 3-in., 1 3-in. A.A.

* Reconstructed 1936.

|| Reconstructed 1935.

§ Modernised 1934.

† Modernised 1928-1931, including fitting of bulges and new foremast, and conversion to oil burning. Hiyei of this class has been de-militarised and converted to a training ship in accordance with London Naval Treaty.

JAPAN.—Aircraft Carriers.

Class.	NAME.	Standard Displacement.	Length. (Extreme.)	Beam.	Draught.	Horse-Power, Type of Machinery and Boilers.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour.		Armament.		Speed.	Fuel.		Complement.
											Side Deck.	Gun Position.	Guns.	Torpedo Tubes.		Coal.	Oil.	
A.C.	Akagi*	26,900 tons.	763 ft. b.p.	92	21 2	131,200 (G.)	Kure	1925	1927	£ ..	in.	in.	10 8-in., 12 4.7-in. A.A., capacity for 50 aircraft. Carries about 30 aircraft	—	knots, 28.5	tons, 3900	..	..
A.C.	Hosho†	7470	510 ft. b.p.	48 62	15 0	30,000 (G.)	Tsurumi. (Asano)	1921	1922	..	..	..	4 5.5-in., 2 3-in. A.A., 26 aircraft	—	25	— 2700	550	..
S.C.	Kamoi §	17,000	495	67	28 0	8,000 turbines and electric drive	New York S.B. Co.	1922	1922 (converted 1933)	..	..	..	2 5.5-in., 2 3-in. A.A., 10 seaplanes	—	15	4000	..	..
A.C.	Kaga†	26,900	715 ft. b.p.	102½	22 1	91,000 (G.)	Kobe (Kawasaki)	1921	1928	..	..	..	10 8-in., 16 4.7-in. A.A., capacity for 60 aircraft. Carries about 30 aircraft	—	23	— 5300	..	..
S.C.	Notoro §	14,050	455 ft. b.p.	58	26 6	5,850 recip.	Kobe (Kawasaki)	1920	1920	..	..	..	2 4.7-in., 2 3-in. A.A., 16 seaplanes	—	12	— 1000	..	..
A.C.	Ryūjo	7100	548	60' 8"	15 0	40,000 (G.)	Yokohama	1931	1933	..	..	..	12 5.1-in., A.A., 24 aircraft	—	25	oil	600	..
A.C.	Soryu	10,050	638	68' 4"	16 6	60,000 (G.)	Kure	1935	1937	..	..	..	12 5-in., A.A., 40 aircraft	—	30	..	..	..
A.C.	Hiryu	10,050	638	68' 4"	16 6	60,000 (G.)	Yokosuka	1937	..	..	..	..	12 5-in., A.A., 40 aircraft	—	30	..	..	..
A.C.	Koryu	10,050	638	68' 4"	16 6	60,000 (G.)	Yokosuka	Bldg. 1936	1938	..	..	..	12 5-in., A.A., 40 aircraft	—	30	..	..	..
S.C.	Chitose	9,000	..	..	..	15,000 tur. & t.b.	Kure	1937	..	..	..	..	4 5-in. A.A.	—	20	..	..	..
S.C.	Chōda	9,000	..	..	..	15,000 tur. & t.b.	Kure	1937	..	..	..	..	4 5-in. A.A.	—	20	..	..	..
S.C.	Mizuo	10,000	647 w.l.	59	17	13,000 (D.)	Yokosuka	1933	1934	..	..	..	4 5-in. A.A., 12 M., 3 seaplanes	—	20	..	413	..
S.C.	Taigai	10,000	647 w.l.	59	17	13,000 (D.)	Yokosuka	1933	1934	..	..	..	4 5-in. A.A., 12 M., 3 seaplanes	—	20	..	413	..

* Designed as a battle cruiser. † Fitted with gyro-stabiliser. ‡ Designed as a battleship. § Converted from oilers. Seaplane carriers. Other vessels carry landplanes. New construction—not known.

JAPAN.—Cruisers.

Class.	NAME.	Standard Displacement.	Length. (Extreme)	Beam.	Draft.	Horse-Power, Type of Machinery and Boilers.	Where Built.	Date of Launch.	Date of Completion.	Cost	Armour.		Armament.		Speed.	Fuel.	Complement.
											Side.	Deck.	Guns.	Torpedo Tubes.			
Mogami Class	Tone .	8500	614.3	63.1	14.7	90,000	Nagasaki	1937	Bldg.	£	in.	—	12 6-1-in., 8 5-in. A.A., 4 aircraft, 1 catapult	12 21-in. a.w.	33	..	..
	Tikuma .	8450	w.l.					1938		..	2	—	..	..	33	..	..
	Mogami .						(Kure)	1934	1935	2,500,000	2	2	..	..	33	..	..
	Mikuma .						Nagasaki	1934	1936	estimated	—	—	15 6-1-in., 8 5-in. A.A., 2 catapults, 4 aircraft	12 21-in. a.w.	33	..	..
	Suzuya .						Yokosuka	1934	1936		—	—	..	..	33	..	..
Myoko Class	Kumano .						Kawasaki	1936	1937		—	—	..	..	33	..	..
	Chokai .						(Nagasaki)	1931	1932		3-4	—	10 8-in., 4 4-7-in. A.A., 2 M. 2 catapults, 4 seaplanes	8 21-in. a.w.	33	2000	692
	Maya .						Kobe	1930	1932	..	3-5	—	..	..	33	—	692
Nachi Class	Atago .						(Kure)	1930	1932		—	—	..	..	33	—	692
	Takao .						Yokosuka	1930	1932		—	—	..	..	33	—	692
	Ashigara .						(Kobe)	1928	1929		—	—	..	..	33	—	692
Furutaka Class	Haguro .						Nagasaki	1928	1929	..	3-4	3-5	10 8-in., 8 4-7-in. A.A., 2 M. 2 catapults, 4 seaplanes	12 21-in. a.w.	33	—	692
	Myoko .						Yokosuka	1929	1929	..	—	—	..	..	33	—	692
	Nachi .						(Kure)	1927	1928		—	—	..	..	33	—	692
Chikuma Class	Kinugasa .						(Kawasaki, Kobe)	1926	1927	..	—	—	6 8-in., 4 4-7-in. A.A., 10 M. 1-2 planes, 1 catapult	12 21-in. a.w.	33	400	604
	Aoba .						Nagasaki	1925	1927	..	—	—	..	..	33	400	604
	Furutaka .						(Kure)	1925	1926	..	—	—	6 8-in., 4 7-in. A.A., 6 M. 2 planes, 1 catapult	12 21-in. a.w.	33	1400	604
Natori Class	Kako .						(Kawasaki, Kobe)	1925	1926	..	—	—	..	..	33	—	604
	Hirado .						Kobe	1911	1912	..	2½	—	8 6-in., 2 8-in., 2 8-in. A.A., 2 M. 2 M.	3 18-in. a.w.	26	900	410
	Yahagi .						Nagasaki	1911	1912	..	—	—	..	..	26	300	410
Natori Class	Abukuma .						(Uraga)	1923	1925	..	—	—	7 5-6-in., 2 3-in. A.A., 2 M. 1 seaplane, 1 catapult, 80 mines	8 21-in. a.w.	33.0	800	450
	Isuzu .						Uraga	1921	1923	..	—	—	..	..	33.0	800	450
	Nagara .						Sasebo	1922	1922	..	—	—	..	..	33.0	800	450
	Natori .						Nagasaki (Mitsubishi)	1922	1922	..	—	—	..	..	33.0	1260	450

Natori Class	Yura .	5170	535	47½	15½	70,000 (G.)	Sasebo .	1922	1923	2	..	7 5.5-in. 2 3-in. A.A., 2 M., 1 seaplane, 1 catapult, 80 mines	8 21-in. a.w. (D.)	300 1260	450
Sendai Class	Kinu .	5195	535	47½	15½	90,000 (G.)	Kawasaki	1922	1922	2	..	7 5.5-in. 2 3-in. A.A., 5 M., 1 seaplane, 1 catapult, 80 mines	8 21-in. a.w. (D.)	300 1260	450
	Jintou .						Kawasaki	1923	1925						
	Naka .						Yokohama	1925	1925						
	Sendai .						Nagasaki	1923	1924						
Kuma Class	Kiso .	5100	535	47½	15½	70,000 (G.)	Nagasaki	1920	1921	2	..	7 5.5-in. 2 3-in. A.A., 2 M., 1 seaplane, 80 mines	8 21-in. a.w. (D.)	300 1260	439
	Kitakami .						Sasebo .	1920	1921						
	Kuma .						Sasebo .	1919	1920						
	Oi .						Kobe .	1920	1921						
Tenryu Class	Tama .	2890	465	39½	11½	57,000 (G.)	Nagasaki (Mitsubishi)	1920	1921	6 5.5-in. 1 3-in. A.A., 2 M., 34 mines	4 21-in. a.w. (D.)	820	328
	Tatsuta .						Sasebo .	1918	1919						
	Tenryu .						Yokosuka	1919	1919						
	Yubari .						Sasebo .	1923	1923						

MINELAYERS.—Katsuriki (1917), 1540 tons, 13 knots, 3 3-in., 150 mines; Itsukushima (Uruga, 1929), 1970 tons, 16 knots, 3000 H.P. (Diesel), 3 5.5-in., 2 3-in. A.A., 250 mines; Tokiwa, 9240 tons, 21 knots, 2 8-in., 8 6-in., 3 3-in., and 19 smaller vessels, 300—400 tons, about 12 knots, 2 3-in., 45 mines. Okinoshima (1936) 4400 tons, 9000 H.P., 20 knots, 4 5.5-in., 4 M.G.

MINESWEEPERS.—Nos. 1, 2, 3 (1923), No. 4 (1925), and Nos. 5, 6 (1929), 615 tons, 20 knots, 2 4.7-in., 1 3-in. A.A. Nos. 13—14 (1933), and Nos. 15—18 (1935—36), 492 tons, 2 4.7-in. guns, and Nos. 19—24 are projected.

GUNBOATS.—Saga (1912), 685 tons, 15 knots, 1 4.7 in., 3 3-in. A.A.; Ataka (1922), 725 tons, 16 knots, 2 4.7-in., 2 3-in. A.A.; Yodo, 1320 tons, 22 knots, 2 3-in. RIVER GUNBOATS.—Futami (1930), Atami (1929), 170 tons, 16 knots, 13-in. gun; Katata, Hira, Hodzu, Seta (1923), 305 tons, 16 knots, 2 3-in. A.A.; Toba (1911), 215 tons, 15 knots, 2 3-in.; and Kotaka (1930), 50 tons, 15 knots, 5 M.G.

SUBMARINE DEPÔT SHIPS.—Taigei (1934), 10,000 tons, 689 feet, 13,000 H.P., 20 knots, 4 5-in. A.A.; 3 seaplanes, now used as seaplane carrier; Chogei (1924), Jingei (1923), 5160 tons, 16 knots, 4 5.5-in., 1 seaplane; Komahashi (1914), 1125 tons, 13.9 knots, 2 3-in., 1 3-in. A.A.; Karasaki (1896), 9750 tons, 13 knots, 1 3-in., 1 3-in. A.A.

ANTI-SUBMARINE NETLAYERS.—Yayeyama (1932), 1135 tons, 4800 H.P. (reciprocating machinery), 20 knots, 2 4.7-in. A.A.; Shirataka (1929), 1345 tons, 16 knots, three 4.7 in. A.A. guns. Tsubane and Kamone (1929), 450 tons, 19 knots, 1 3-in. Matsushima, Sarusima and Nasami, 443 tons, 19 knots, 2 3-in. guns.

SUBMARINE CHASERS.—Nos. 1, 2, 300 tons, 24 knots; No. 3, 270 tons, 20 knots; 51—53, 170 tons, 4 M.G. REPAIR SHIP AND SUBMARINE SALVAGE SHIP.—Asahi (ex-Battleship, 12,000 tons), 18 knots. Repair Ship—Akashi, building. Salvage Ships. Cable Ships.

TRANSPORTS AND OTHER AUXILIARIES. ICEBREAKERS.—Otomari (1921), 2330 tons, 13 knots, 1 3-in. TARGET SHIP.—Settsu, 16,130 tons.

ARMED OILERS.—Tukasaki and Tsurgisaki (1937), 12,000 tons, 19 knots, 4 5-in. guns. Naruto, Hayayono, Ondo, Iro, Tsurumi, Shiriya, Sata, Erimo (1920—23), 14,050 tons, 12 knots, 2 5-in., 2 3-in. A.A. Sundsaki (1918), 8800 tons, 14 knots, 2 4.7 in., 2 3-in. A.A. SURVEYING SHIP.—Koshu, 2080 tons, 10.3 knots, 2 3-in.

TRAINING SHIPS.—Hiyei, 19,500 tons, 18 knots, 6 14-in., 16 6-in., 4 5-in. A.A.; 4 3-in. A.A.; Skikishima, 11,275 tons; Fuji, 9179 tons.

TRANSPORTS.—Mamiya, 15,820 tons, 14 knots, 2 5.5-in., 2 3-in. A.A.; Muroto, Noshima, 8215 tons, 12½ knots, 2 4.7-in.

NETHERLANDS.

Class.	NAME.	Standard Displacement.	Length. (Extreme.)	Beam.	Draught.	Horse-Power. Type and Boilers.	Where Built.	Date of Launch.	Cost.	Armour.						Armament.		Speed.	Fuel.		Complement.
										Belt.	Deck.	Slide above Belt.	Bulkhead.	Heavy Guns.	Gun Position. Second-ary.	Guns.	Torpedo Tubes.		Coal.	Oil.	
cr.	De Ruyter	6450 tons.	560 ft.	51 ft.	16 ft.	66,000 P.T. Y.	Rotterdam (Wilton-Fijenoord)	1935 1936	£ ..	in. 2	in. 1½	in. ..	in. ..	in. ..	in. ..	7 5-9-in., 10 1-5-in. A.A., 8 1-5-in. A.A.; 4 M., 1 catapult, 2 seaplanes	—	knots 32	1000 tons.	435	
cr.	Java *	6670	509½	52½	18	72,000 tur.	Amsterdam	1921 1925	..	3	1	1	..	4	..	10 5-9-in., 6 1-5-in., 4 2-pr., 8 M., 40 mines, 2 seaplanes	—	31	—	525	
"	Sumatra *							1920 1926													
a.g.b.	Brinio	530	172½	28	9½	1500 Diesel	Amsterdam	1912 1914	..	2	¾	..	..	..	..	4 4-1-in., 2 M.	—	14	34	63
"	Friso							1912 1914													
"	Gruno							1913 1915													
e.d.s.	Hertog Hendrik	4371	317	50	19	6282 t. Y.	Amsterdam	1902 1903	347,500	6	2	..	..	10	3	1 9-4-in., 4 5-9-in., 2 3-in., 6 1-pr., 2 M.	—	16.5	710	302
"	Soerabaja	5644	333	56	20½	8008 Y.	Amsterdam	1909 1910	H.N.S. 6-4	H.N.S. 6-4	2	..	..	H.N.S. 10	4	2 11-4-in., 2 3-in., 8 1 5-in., 2 M.	—	t	—	350
"	Jacob van Heemskerck	4445	321½	50	19	6396 t. Y.	Amsterdam	1906 1908	347,500	H.N.S. 6-4	2	..	..	10	6	2 9-4-in., 6 5-9-in., 6 3-in., 4 1-pr., 2 M., 2 seaplanes	—	16.5	520	351
cr.	Tromp	3350	433	40½	18	56,000	Amsterdam	1937 Bldg.	..	2	1	..	..	..	..	6 5-9-in., 4 1-5-in. A.A.	6	32½	860	290

Ships marked * above are in the East Indies Squadron.

GUNBOATS.—(Indian Military Marine): Soemba, Flores (1926-7), and Johan Maurits van Nassau (1933), 1457 tons, 15 knots, three 5.9 in., one 3-in. A.A., 2 m.
MINELAYERS.—Nautilus (1930), used for fishery protection, 800 tons, 14 knots, two 3-in., two 1-pr., 2 m.; Douwe Aukes & Van Meerlant (1922), 687 tons, 13 knots, three 3-in. A.A., 2 m., 130 mines; Medusa and Hydra (1911), 593 tons, 11.5 knots, three 3-in., one 1-pr., 1 m., 65 mines; five old vessels, 240 tons, 7 knots. Willen Van Der Zaan, building, 1350 tons, 15 knots, 2 4.7-in., 4 1.5-in., 120 mines. Minelayers attached to Indian Military Marine: Krakatau (1924), 982 tons, 16 knots, two 3-in. A.A., 4 m., 150 mines, 1 catapult, and 1 seaplane; Pro Patria (1923), 534 tons, 10 knots, one 3-in. A.A., 2 m., 80 mines; Prins Van Oranje and Gouden Leeuw (1932), 1291 tons, 15 knots, two 3-in., 2 1.5-in., and 1 aircraft; Seroang, 680 tons, 13 knots, 2 1-pr.; Jan Van Braker, 1350 tons, 15 knots, 2 3-in., 1 1-pr.
MINESWEEPERS.—L-IV, 200-235 tons; (for the Indian Military Marine): A, B, C, D (1930), 179 tons; and one 1600 tons building. Jan Van Amstel, Abraham van Der Hulst, Jan van Cierer, Pieter Florisz, Willem van Ewijk, Erand Dubois, Abraham Crijmsen, Pieter de Bitter (1937), 525 tons, 15 knots, 1 3-in., 4 m.
SURVEYING VESSELS.—Eilerts de Haan, Hydrograaf, and in the Indian Military Marine, Tydeleman, and Willebrod Snellius, 10 knots, 1 3 in., 1 1-pr.
SUBMARINE DEPOT SHIPS.—Cornelius Drebbel (1915), 688 tons, 170 H.P. (Diesel), 6 knots.
OLD LIGHT CRUISER Gelderland (1900), 3512 tons, now used as gunnery training ship. Old **GUNBOATS** (1877-9): Hefring, Braga, Tyr and Freyr, 244 tons, 7-8 knots, 1 4.7-in. **POLICE AND CUSTOMS VESSELS.**—Seventeen in No., armed with 2 3-in. guns, 12-20 knots, 600-1000 tons.
MOTOR TORPEDO BOATS.—T.M. 1, 2, 4 (1929) Thornycroft, 12 tons, 37 knots, 4 m., 2 17.7-t.r.; T.M. 5, 6, building. 20 M.T.B.'s are to be built in 1939.
 New Programme includes 1 cruiser 8000 tons, 10 5.9-in., 12 1.57-in., and 1 light cruiser similar to Tromp.

NORWAY.

Class.	NAME.	Normal Displacement.	Length. (Extreme.)	Beam.	Draft.	Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour.					Armament.		Speed.	Fuel.		
											Belt.	Deck.	Side above Belt.	Bulkhead.	Gun Position.	Guns.	Torpedo Tubes.				
e.d.s.	Eidsvold : Norge :	4168	310½	50½	17½	4500 Y.	Elswick	1900	1901	350,000	6 H.N.S.	2	..	..	6 H.N.S.	2 8½-in., 6 5-9-in., 8 3-in., 2 2 8-pr.	2 (sub.) 18-in.	2	16.5	550	270
"	Harald Haarfagre.	3858	304	48½	17½	4500	Elswick	1896	1898	300,000	7 H.S.	2	..	..	8	2 8-2-in., 6 3-in.	3 (sub.) 18-in.	3	16.5	550	249
"	Tordenskjold*							1897	1899						8 H.S.	2 8-in. A.A., 6 M.	2 (sub.) 18-in.	2			

FISHERY PROTECTION VESSELS: Fridtjof Nansen (1931), 1050 tons, 15 knots, 2000 H.P., two 4-in., two 2-pr.; Heindal (1892), 660 tons, 12 knots; four 12-pr.; and Michael Sara, 300 tons. MINELAYERS: Frøya (1918), 760 tons, 22 knots, 4-4-in. 1-3-in. A.A., 100 mines; Glommen and Laugen (1918), 335 tons, 9½ knots, 2-3-in. M., 150 mines; old gunboats, refitted as minelayers, Tyr, Gor, Vidar, Brage, Nor, Vale, and Uller, 230-280 tons, armed with one 4-7-in. and other guns. Olav Trygvason, 11 minelayer and training ship, built at Horten, 1600 tons, 21½ knots, 6000 H.P., 4 4-7-in. and 1 3-in. A.A. guns, and 2 T.T.s. (18 in.), 280 mines. SUBMARINE DEPÔT SHIP, Sarpen, 187 tons, 9 knots, two 9-pr. and one 1-pr. CABLE SHIP, Telegraf (1895).

* Employed as training ship for Cadets.

†† 1500 H.P. Diesels, 4500 H.P. turbines. Max. speed on Diesels, 14 knots.

SOVIET UNION.—Battleships.

Class.	NAME	Normal Displacement.	Length (Extreme)	Beam.	Draught.	Horse-Power.	Where Built.	Makers of Engines.	Date of Launch.	Date of Completion.	Cost.	Armour.					Armament.		Speed.	Fuel. Coal. Oil.	Complement.
												Belt.	Deck.	Side above Belt.	Bulkhead.	Gun Position. Heavy Gun. Second-ary.	Gunn.	Torpedo Tubes.			
b.	Paris Commune (ex-Sevastopol) †	23,000 tons.	594	87	27½							in.	in.	in.	in.	in.			knots.		
b.	October Revolution (ex-Gangut) ||	23,000	594	87	27½	42,000 P.T.	(Baltic Works	Baltic Works	1911	1915	..	9-5	3	..	12-10	6	12 12-in., 16 4.7 in., 10 4 3-in. A.A., and smaller, 2 (sub.) seaplanes.	4 18-in.	23	2000 1000	1125
b.	Marat (ex-Petro- parlovsk) *	23,606	594	87	31																
b.	Mikhail Frunze	23,000	594	87	27½				1911	1915											

† Modernised, 1937.

|| Modernised, 1933.

* Modernised, 1931.

Two 35,000 ton battleships projected 16-in. guns.

Aircraft Carriers.

A.C. Stalin (building) 22 aircraft. Krasni Moryak (1916) 7,600 tons, 29 knots, 12 escaplanes.

SOVIET UNION.—Cruisers.

Class.	NAME.	Displacement. (Normal)	Length. (Extreme)	Beam.	Draft.	Horse- Power.	Where built.	Date of Launch.	Date of Completion.	Cost.	Armour.		Armament.		Speed.	Fuel.	Complement.
											Belt. Deck.	Gun Position.	Guns.	Torpedo Tubes.			
cr.	Aurora (ex-S.S.S.R.) †.	6730 tons.	416 ft.	55 ft.	21 ft.	11,600	Petrograd	1900	1903	£ ..	in. ..	in. ..	10 5.1-in., 5 6-pr. A.A., 2 m., 125 mines	2	18 knots.	964 tons.	573
m.cr.	Marti	3500	..	..	..	..	..	..	1936	..	..	..	4 5.1-in., 3 3-in. A.A., 300 mines	..	..	..	..
cr.	Chevonnnaya-Ukraina (ex-Ad. Nakhimov)	7600	507½	50½	18½	55,000 P.T. (Y.)	Nikolaev	1915	1923	..	3	..	15 5.1-in., 4 3-in., 8 3-in. A.A., 4 m., 100 mines, 2 flying boats	12 21-in.	29½	540 tons.	600
"	Komintern †	6675	440	54½	20½	19,500	Nikolaev	1903	1907	..	1	..	10 5.1-in., 8 3-in. A.A., 1 aircraft	2 (sub.)	23	1190	595
"	(ex-Famyat Merkuriya)	7600	535	51½	19	60,000	Nikolaev	1916	1930	..	3	3	4 7.1-in., 4 3-in. A.A., 4 4-in. A.A., 4 m., 100 mines, 2 seaplanes	12 (a.w.)	29½	540	650
"	Krasni Kavkaz (ex-Ad. Lazarev)	7200	507½	50½	18½	55,000 P.T. (Y.)	Reval	1915	1925	..	3	3	15 5.1-in., 4 4-in. A.A., 4 3-in. A.A., 2 aircraft, 100 mines	12 21-in.	29½	540	..
"	Profintern (ex-Svietlana)	..	..	..	..	..	..	..	1937	..	1	..	— 7.1-in., — 4-in., — 1.5-in. A.A.	6	33	..	..
"	Kirov	80,000	..	..	..	..	..	..	1938	..	..	..	..	..	..	..	..
"	Maxim Gorki . . . . .	..	..	..	..	..	..	..	Bldg.	..	..	..	..	..	..	..	..
"	Molotov . . . . .	..	..	..	..	..	..	..	Bldg.	..	..	..	..	..	..	..	..
"	Voroshilov . . . . .	..	..	..	..	..	..	..	Bldg.	..	..	..	..	..	..	..	..

† Training ship.

GUNBOATS.—Krazni Vostok, Sun Yat Sen, Lenin, Chicherin, Sverdloff (1910), 950 tons, 11 knots. Bednota, Krasnose-Shamsa, Rabotchi, Proletarii, Krasni Buryat, Krasni Mongol, Krasni Moryak (1907), 11 knots, 190 tons, 2 4.7-in. Krasni Azerbaidzham, Lenin (1909), 640 tons, 12 knots, 2 4-in., 2 3-in. Krasnoe Znamya (1895), 1,760 tons, 12 knots, 5 5-in. Krasni Adzhariastan, Krasni Kim, Krasnaya Gruziya, Krasnaya Abkhazia (1906), 1,100 tons, 9 knots, 3 5.1-in., fitted for minelaying.

MINELAYERS.—9 Vanvarna (1905), 1,711 tons, 12 knots, 2 3-in., 2 1.85-in., 280 mines. 25 Oettabeya (1873), 4,500 tons, 11 knots, 4 3-in. 600 mines. 6 others.

MINESWEEPERS.—Mikula, Iskra, 500 tons, 1 3-in. Zapal, Zmei, Klyuz (1911), 180 tons, 11 knots, 1 3-in. Dsalita (1926), 359 tons, 10 knots, 2 3-in. Dorotea (1924), 443 tons, 10 knots, 2 3-in. Udamnick (1917), 185 tons, 10 knots, 1 3-in.; Nos. I-VI (1935), 400 tons, 16 knots, 1 4-in., 1 m.g. 24 others.

OILERS.—Gornjak (1898), 1,576 tons, 12 knots.

ICE-BREAKERS.—Josef Stalin, Kaganovitch, Molotov (1936-38), 10,000 tons, 15 knots, 3 Seaplanes. Lenin, 7,000 tons, 19 knots. Krassin (1917), 10,000 tons, 15 knots.

Sadico (1913), 1,616 tons, 14 knots. Maligin (1912), 1,535 tons. Sepov, Rusanov, Sibiryakov (1909), 1,140 tons, 12 knots. Yermak (1898), 8,000 tons, 15 knots. Truvor (1896), 1450 tons, 13 knots. Davidov, 1,525 tons, 15 knots. Bobrimiya Nikitich (1916), 1664 tons.

DEPOT SHIPS.—Krasni Gorn (1911), 1892 tons, 11 knots. Serp-I-Molot (1900), 6,000 tons, 11 knots. Smolna, 3,200 tons, 10 knots. Kommuna (1913), 2,400 tons, 10 knots.

Sovetskaya Rossiya, 5,200 tons, 12 knots. Oka (1914), 1,982 tons, 10 knots.

TRAINING SHIPS.—Sver, 10,000 tons, 15 knots. Kursant, Ucheba, Praktika.

GUARDSHIPS.—Razvedchik (1904), 100 tons, 16 knots, 2 3-pr. Dzerzhinski, Kirov (1934), 800 tons, 20 knots, 2 4-in., 4 1.5-in. A.A.

SPAIN.

Class.	NAME.	Standard Displacement.	Length. (Extreme).	Beam.	Draught.	Horse-Power. Type and Boilers.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour.		Armament.	Torpedo Tubes.	Speed.	Fuel.	
											Side Deck.	Gun Position.				Coal.	Oil.
b.	Jaime I.*	14,224 tons.	459½ ft.	78½ ft.	25½ ft.	20,000 P.T. Y.	Ferrol	1914	1921	£ ..	8-5 k.s. 10 (heavy)	ina. 10 (sec.)		—	20·2 kts.	1850 tons.	854
l. cr.	Canarias.	10,000 tons.	636 ft.	64 ft.	17·4 ft.	90,000 P.T.(G.) Y.	Ferrol	1931	1934	..	2-1 3 (sec.)	1	8 8-in., 8 4·7-in. A.A., 2 scaplanes; 1 catapult.	12 21-in. (T.)	33·0 kts.	—	765
"	Miguel de Cervantes							1928 1930			3	..	8 6-in., 4 4-in. A.A., 2 3-pr., 1 m.	12 21-in. (T.)	33·0 kts.	—	560
"	Almirante Cervera	7475 tons.	579½ ft.	54 ft.	16½ ft.	80,000 P.T.(G.) Y.	Ferrol	1925 1928		..	1	..	6 6-in., 4 3-pr. A.A., 4 m., 1 l.	4 21-in. (T.)	25·5 kts.	1200 tons.	404
"	Libertad (ex-Principe Alfonso)							1925 1927		..	3-1½	3		4 21-in. (T.)	25·5 kts.	230 tons.	
"	Navarra, ex-Republica (ex-Reina Victoria Eugenia)	4857 tons.	462 ft.	50 ft.	15½ ft.	25,500 P.T. Y.	Ferrol	1920	1923	..	—	3		—	—	—	
"	Mendez Nuñez	4509 tons.	462 ft.	46 ft.	14½ ft.	45,000 (G.)	Ferrol	1922	1924	..	3	..	6 6-in., 4 3-pr. A.A., 4 m.	12 21-in. (T.)	29 kts.	800 tons.	320
g.b.	Eduardo Dato							1923 1925		..	..	..	4 4-in., 2 3-pr., 2 m.	—	15 kts.	324 tons.	220
"	Jose Canalejas	1314 tons. (normal)	251½ ft.	23½ ft.	11½ ft.	1700 tur.	Ferrol	1922 1924		..	..	..		—	—	—
"	Antonio Canovas del Castillo							1922 1923		..	..	..		—	—	—
"	Lauria	800 tons. (normal)	213½ ft.	30 ft.	9½ ft.	1100 Y.	Cartagena	1912 1911		..	..	..	4 4-in., 2 m.	—	14·0 kts.	148 tons.	127
"	Laya.									..	..	..		—	—	—

* Sunk 17/6/37; refloated and all guns removed.

Sailing Training ships: Sebastian Elcano (1928), 3500 tons, 800 H.P. (Diesel), 9·5 knots, 4 2·4-in.; Galatea (ex-Clamartella) (1903), 2710 tons, 8½ knots, 2 2·24-in. Submarine salvage vessel Kangaro (1917), 2707 tons, 10 knots, four 2-pr. Oiler Pluton. Survey vessels Tofino, Malaspina, 1200 tons, 12 knots.

ARMED TRAWLERS.—Alcazar, Larache and Tetuan, 400 tons, 10 knots, 1 3-in. (also 2 3-pr. in Alcazar); Arcila, 510 tons, 10½ knots, 2 3-in.; Uad Martin, Uad Lucas, Uad Muluya, 420 tons, 10 knots, 1 3-in.; Uad Quert, Xaven, 650 tons, 10½ knots, 1 3-in.

FISHERY PROTECTION VESSELS.—8 in number, 150 tons, 11 knots, 1 6-pr.

MINELAYERS.—Jupiter, Marte, Neptuno, 2100 tons, 18½ knots, 4 4·7-in. A.A., 4 1·6-A.A., 4 m.c., 264 mines, 2 depth charge release gears.

TRANSPORTS.—Almirante Lobo, 2505 tons, 12 knots, 2 1·6-in.; Contramaestre Casado, 7275 tons, 10½ knots, 4 1·6-in.

TUGS.—Cartagenero, Ferroland, Gaditano, 300 tons, 10 knots, 1 6-pr.; Galicia, 350 tons, 10 knots, 1 3-in.; Ciclope, 800 tons, 12 knots, 1 3-in.

Three coastguard patrol vessels, 250 tons, ordered and three fishery protection vessels projected.

Class.	NAME.	Standard Displacement.	Length. (Extreme.)	Beam.	Draught.	Horse-Power. Type of Machinery	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour.					Armament.		Speed.	Fuel Coal, Oil.	Complement.
											Belt	Deck.	Side above Belt.	Bulkhead.	Gun Position.	Guns.	Torpedo Tubes.			
c.d.s.	Aran .	3361 287	494 16-7	61	16-7	7000 Y. f.	Gothenburg	1901	1902	..	7 K.S.	1½	..	..	7½ K.S.	2 8-2-in., 6 5-9-in., 10 6-pr., 1 1-pr.	2 sub. 18-in.	17-2 f	300	287
"	Drottning- Victoria	7100 396-7	61	21½	22,000 (G.)	Gothenburg	1917	1921	1922	666,000	8-6 K.S.	1½	4 H.S.	..	8 K.S.	4 11-in., 8 5-9-in., 4 3-in., 2 6-pr., 6 M.	—	23-0	690	450
l. cr.	Fylgia .	4200 378	48-6	20-6	12,444 Y. f.	Stockholm	1905	1907	1908	385,700	4 K.S.	2	..	..	5 K.S.	8 5-9-in., 10 6-pr., 2 1-pr.	2 sub. 18-in.	22-7 f	900	328
Harar Cruiser	Gotland .	4700 442	50-6	14-7	783,000 (G.)	Gothenburg	1933	1934	1910,000 (estimated)	..	..	..	..	..	..	6 6-in., 4 3-in. A.A., 4 M., 100 mines, 8 seaplanes, 1 catapult	—	27-0	oil	453
c.d.s.	Gustav V.	7100 398-7	61	21½	22,000 (G.)	Malmö	1918	1922	666,000	8-6 K.S.	1½	4 H.S.	..	..	8 K.S.	4 11-in. 8 5-9-in., 4 3-in. A.A., 2 6-pr., 6 M.	—	23-0	690	450
"	Manligheten	3361 287	49½	17-4	7400 Y.	Malmö	1903	1904	..	7 K.S.	1½	..	..	..	7½ K.S.	2 8-2-in., 6 5-9-in., 8 6-pr., 1 1-pr.	2 sub. 18-in.	17-0	300	300
"	Oscar II .	4250 313-6	50-5	18	9000 Y.	Gothenburg	1905	1907	..	6 K.S.	2	6 K.S.	..	6	7½ K.S.	2 8-2-in., 8 5-9-in., 8 6-pr., 1 1-pr.	2 sub. 18-in.	18-0	500	330
"	Sverige .	6899 392-7	61	21½	20,000 tur. Y.	Gothenburg	1915	1917	666,000	8-6 K.S.	1½	4 K.S.	..	..	8 K.S.	4 11-in., 8 5-9-in., 4 3-in., 2 6-pr., 6 M.	—	22-5	690	450
"	Tapperheten	3361 287	49½	17-7	6000 Y.	Malmö	1901	1903	..	7 K.S.	1½	..	..	..	7½ K.S.	2 8-2-in., 6 5-9-in., 10 6-pr., 1 1-pr.	2 sub. 21-in.	16-5	300	287
"	Wasa .	3361 287	49½	17	6500 Y.	Stockholm	1901	1902	..	7 K.S.	1½	..	..	..	7½ K.S.	2 8-2-in., 6 5-9-in., 10 6-pr., 1 1-pr.	2 sub. 21-in.	17-2	300	287

Drottning-Victoria, Gustav V. and Sverige have been reconstructed and modernised (1929-33). Minelayer Class Fleming, 1570 tons, 4.4-7-in., 20 knots, 100 mines; Depot ship for submarines Svea (1886), 2795 tons, 2 1-5 A.A. Aircraft depot ship Dristigheten (1901), 3218 tons, 6 knots, 4 3-in., 3 aircraft. Depot Ships:—Niord (1899), 3297 tons; Göta, 3350 tons. Jacob Bagge, Öngy, 738 tons, 20 knots, 2 4-7-in. guns. Sailing training ships: Af Chapman, Najaden, Jarramas and Falken (1877-1900).

Velde Boats (used for minelaying and minesweeping).—Käparen, Jagaren, Snapphanen, Vaktaren, 290 tons, 24 knots, 2 3-in., 2 1-in. A.A.; Sokaren, Sveparen, Sprangaren, 160 tons, 10 knots 1-6 pr.; Nos. 27, 28, 30, 33-36, 90 tons, 23 knots, 2 1-5-in., 1 15-in. T.T.; No. 19, 55 tons, 10 knots, 1 1-5 in.

Motor Torpedo Boats—Nos. 3, 4, 11 tons, 41 knots, 1 m, 2 18-in. T.T.

Minesweepers—Starköder, Styrbjörn, 350 tons, 15 knots, 2 1-5-in.; M. 1, 2, 60 tons, 16½ knots, 2 M.G.; Arkolma, Landsort, 370 tons, 17½ knots, 2 3-in. 1 M.G.

Icebreakers—Atle, 1720 tons, 16 knots; Ymer, 3450 tons, 18 knots.

UNITED STATES.—Battleships.

Class.	NAME	Standard Displacement.	Length. (Extreme.)	Beam.	Draught.	Horse-Power. Type of Machinery	Where Built.	Date of Launch.	Completion.	Cost. \$	Armour.					Armament.		Speed.	Fuel. Coal. Oil.	Complement.	
		tons.	ft.	ft.	ft.					£	Belit.	Deck.	Side above Belt.	Bulkhead.	Gun Position. Heavy Guns.	Second-ary.	Guns.	Torpedo Tubes.	knots.	tons.	
b.	Washington	35,000	..	..	..	..	Philadelphia (Navy Yard)	Blg.	..	..	in.	in.	in.	in.	in.	..	9 16-in. guns, 5-in. secondary armament, 5-in. A.A., 3 aircraft	..	about 28 knots	..	
b.	North Carolina						New York (Navy Yard)				..	..	..	..	..	..	..	..	..	..	..
b.	Indiana						New York (Navy Yard)				..	..	..	..	..	..	..	..	..	..	..
b.	Massachusetts						Norfolk (Navy Yard)				..	..	..	..	..	..	..	..	..	..	..
b.	Alabama						New York (S.B. Co.)				..	..	..	..	..	..	..	..	..	..	..
b.	South Dakota	32,600	608	106½	27½	B. & W. P. tur.	New York (Navy Yard)	1915	1916	1,485,000	14-8 K.S.	3	..	..	18 K.S.	..	12 14-in. (45 cal.), 12 5-in. (51 cal.), 8 5-in. (25 cal.) A.A., 4 3-pr., 2 1-pr., 2 M., 2 L., 2 catapults, 3 floatplanes	—	21.0	— 2322	1350
b.	Arizona †						New York (Navy Yard)	1911	1912	964,000	11-5 K.S.	3	..	8-6 K.S.	11 K.S.	6½	12 12-in. (50 cal.), 16 5-in. (51 cal.), 8 3-in. (50 cal.) A.A., 4 3-pr., 2 1-pr., 2 M., 1 catapult, 3 floatplanes	—	20.5	— 5100	1380
b.	Arkansas *	26,100	562	106	26	P. tur.	New York (S.B. Co.)	1919	1921	2,620,000	14-8 K.S.	3	..	..	18 K.S.	..	12 14-in. (50 cal.), 12 5-in. (51 cal.), 8 5-in. (25 cal.) A.A., 4 3-pr., 2 M., 2 1-pr., 2 catapults, 21-in. floatplanes	2 2 (sub.)	21	— 4656	1412
b.	California	32,600	624	97½	30½	electric drive	Mare Island (Navy Yard)	1921	1923	1,383,000	13½-12 K.S.	..	..	..	18 K.S.	..	8 16-in. (45 cal.), 12 5-in. (51 cal.), 8 5-in. (25 cal.) A.A., 4 3-pr., 2 1-pr., 2 M., 2 catapults, 21-in. floatplanes	2 2 (sub.)	21.0	— 4570	1407
b.	Colorado.	32,500	624	97½	30½	B. & W. tur. electric drive	New York (S.B. Co.)	1921	1923	1,383,000	13½-12 K.S.	..	..	..	18 K.S.	..	8 16-in. (45 cal.), 12 5-in. (51 cal.), 8 5-in. (25 cal.) A.A., 4 3-pr., 2 1-pr., 2 M., 2 catapults, 21-in. floatplanes	2 2 (sub.)	21.0	— 4570	1407

b. Idaho †	33,400 624	106‡	29‡	40,000 B. & W. P.T.	New York (S.B. Co.)	1917 1919	1,485,000	14 K.S.	3	..	18 K.S.	..	12 14-in. (50 cal.), 12 5-in. (51 cal.), 8 5-in. A.A., 4 3-pr., 2 1-pr., 2 M., 2 L., 2 catapults, 3 float planes	2 21‡ (sub.) 21-in.	— 3271	1974
b. Maryland	31,500 624	97‡	29‡	27,300 B. & W. tur. (G.) and electric drive	Newport News	1920 1921	1,383,000	13‡-12 K.S.	..	..	18 K.S.	..	8 16-in. (45 cal.), 12 5-in. (51 cal.), 8 5-in. (25 cal.) A.A., 4 6-pr., 2 1-pr., 2 M., 2 catapults, 3 floatplanes	2 21 (sub.) 21-in.	— 4570	1410
b. Mississippi †	33,000 624	106‡	29‡	40,000 B. & W. C.T. (G.)	Newport News	1917 1917	1,485,000	14 K.S.	3	..	18 K.S.	..	12 14-in. (50 cal.), 12 5-in. (51 cal.), 8 5-in. A.A., 4 6-pr., 2 1-pr., 2 M., 2 catapults, 3 floatplanes	2 21 (sub.) 21-in.	— 3271	1374

* See note * on p. 267.

† Modernised, 1934. (See ‡, p. 267.)

‡ The sums given in this column are exclusive of the cost of armour and armament according to the system of making appropriations in the estimates.

† See note † on p. 267.

UNITED STATES.—Battleships—continued.

Class.	NAME.	Displacement tons.	Length (Extreme).	Beam.	Draft.	Horse Power. Type of Machinery	Where Built.	Date of Launch.	Date of Completion.	Cost. £	Armour.					Armament.		Speed.	Fuel. Coal. Oil.	Complement.	
											Belt.	Deck.	Side above Belt.	Bulkhead.	Gun Position. Heavy Guns.	Second- ary.	Guns.				Torpedo Tubes.
b.	Nevada §.	29,000	583	108	27½	25,000 Y. P. tur.	Quincy, Mass. (Fore River)	1914	1916	1,211,342	13½-8 K.S.	1½-3	..	13½ K.S.	18-16 K.S.	..	10 14-in. (45 cal.), 12 6-in. (51 cal.), 8 6-in. (25 cal.) A.A., 4 6-pr., 2 1-pr., 2 M., 2 L., 2 catapulta, 3 floatplanes	—	20.5	2000	1920
b.	New Mexico †	33,400	624	106½	29½	40,000 B. & W. Electric drive	New York (Navy Yard)	1917	1918	1,485,000	14 K.S.	8	..	..	18 K.S.	..	12 14-in. (50 cal.), 12 6-in. (51 cal.), 8 5-in. A.A., 4 6-pr., 2 1-pr., 2 M., 2 catapulta, 3 floatplanes	2 21.5 (sub.) 21-in.	—	3271	1414
b.	New York *	27,000	573	106	26	28,100 B. & W. recip.	New York (Navy Yard)	1912	1914	1,315,114	12-4 K.S.	8	9 K.S.	10 K.S.	14-8 K.S.	6 K.S.	10 14-in. (45 cal.), 16 6-in. (51 cal.), 8 3-in. (50 cal.) A.A., 4 8-pr., 2 1-pr., 2 M., 1 catapult, 3 floatplanes	—	21.0	5200	1450
b.	Oklahoma §	29,000	588	108	28½	25,300 B. & W. recip.	New York (S.B. Co.)	1914	1916	2,200,000	13½-8 K.S.	1½-3	..	13½ K.S.	18-16 K.S.	..	10 14-in. (45 cal.), 12 6-in. (51 cal.), 8 6-in. (25 cal.) A.A., 4 8-pr., 2 1-pr., 2 M., 2 catapulta, 3 floatplanes	—	20.5	2000	1920
b.	Pennsylvania †	33,100	608	106½	28	40,000 B. & W. Cur. tur.	Newport News	1915	1916	1,485,000	14 K.S.	8	..	..	18 K.S.	..	12 14-in. (45 cal.), 12 6-in. (51 cal.), 8 6-in. (25 cal.) A.A., 4 3-pr., 2 1-pr., 2 M., 2 catapulta, 3 floatplanes.	—	21.0	2300	1880
b.	Tennessee .	32,300	624	97½	30½	26,800 B. & W. Tur. electric drive.	New York (Navy yard)	1919	1920	2,620,000	14-8 K.S.	8	..	..	18 K.S.	..	12 14-in. (50 cal.), 12 6-in. (51 cal.), 8 6-in. (25 cal.) A.A., 4 6-pr., 2 1-pr., 2 M., 2 catapulta, 3 floatplanes	2 21.0 (sub.) 21-in.	—	4656	1412

b.	Texas*	27,000	573	106	26	28,100 recip.	Newport News	1912	1914	1,166,000	12-4	3	9	10	14-8	6	10	14-in. (45 cal.), 8 3-in. (30 cal.) A.A., 4 3-pr., 2 1-pr., 2 m., 1 catapult, 3 floatplanes	—	21-0	—	1450
b.	West Virginia	31,800	624	97½	30	27,300 tur. electric drive.	Newport News	1921	1923	1,383,000	13½-1	..	..	..	18	..	8	16-in. (45 cal.), 8 5-in. (25 cal.) A.A., 4 6-pr., 2 1-pr., 2 m., 2 catapults, 21-in. 3 floatplanes	—	21-0	—	1407

Battleship Utah was converted to a mobile target ship in 1931 in accordance with the London Naval Treaty, and the battleship Wyoming was converted to a training ship (speed 18 knots) in 1931 in accordance with London Naval Treaty.

* Modernised in 1927. Modernisation included fitting of bulge protection, protection of decks against aerial attack, conversion to oil burning, installation of 3-in. A.A. battery, and addition of catapults. Cost about £600,000 each ship. Displacement increased about 3000 tons.

† Modernised in 1931. Modernisation included fitting bulges, reboiling, increasing elevation of turret guns, replacing former anti-aircraft batteries by 5-inch A.A. guns, new masts and new fire control.

‡ Taken in hand for modernisation 1931. New Mexico and Mississippi completed 1933. Idaho completed 1934. Modernisation includes fitting, increased deck protection increasing elevation of turret guns, installation of eight 5-in. A.A. guns, reboiling, fitting of new turbines (the electric drive in New Mexico has been replaced by turbine machinery), alterations to masts and bridges, and fitting of bulges.

§ Modernisation in 1929. Alterations include fitting of bulges, deck protection, tripod masts, increasing elevation of turret guns, fitting a new 5-in. anti-aircraft battery. The modernisation of California, West Virginia, Colorado, Maryland, and Tennessee is projected.

UNITED STATES.—Aircraft Carriers.

Class.	NAME.	Standard Displacement.	Length. (Extreme.)	Beam.	Draught.	Horse-Power. Type of Machinery and Boilers.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour.		Armament.		Speed.	Fuel.	Complement.
											Deck.	Gun Position.	Guns.	Torpedo Tubes.			
A.C.	Wasp	14,700 tons.	688 ft. (on w.l.)	80 ft.	20 ft.	(G.)	Bethlehem S. B. Co.	..	Bldg. 1938	£ about 4,000,000	in.	in.	..	..	..	tons.	..
A.C.	Hornet	About 20,000	762 ft. (on w.l.)	83 ft.	21½ ft.	(G.)	Newport News	Bldg. 1936	..	..	..	..	8 5-in. A.A. guns, 76 aircraft	..	..	..	..
A.C.	Yorktown	19,900	769 ft. (on w.l.)	80 ft.	19½ ft.	(G.)	Newport News S. B. Co.	1933	1934	about * 4,000,000	..	..	8 5-in. A.A., 50 M.G., 76 aircraft	..	29½	Oil	1434
A.C.	Ranger	14,500	769 ft.	80 ft.	19½ ft.	(G.)	Bethlehem S. B. Co.	1925	1927	9,000,000	..	..	8 5-in. (55 cal.), 12 5-in. (25 cal.) A.A., 12 M.G.; 4 6-pr. Operates about 80 landplanes. 1 catapult	..	33-9	7100	1670 ex Air
A.C.	Lexington	33,000	880 ft.	105½ ft.	31 ft.	tur. electric	(Fore River) S. B. Co.	1925	1927	9,000,000	3	..	4 5-in. (51 cal.), operates 7 land-planes	..	15	—	411
A.C.	Saratoga	33,000	888 ft.	105½ ft.	31 ft.	tur. electric	N.Y. Ship-building Co.	1912	1922	..	3	..	..	..	..	7100	..
A.C.	Langley †	11,500	542 ft.	65½ ft.	19 ft.	tur. electric	Mare Island Navy Yard	1912	1922	..	..	..	..	..	..	2000	..

For particulars of Aircraft Tenders and Repair Ships, see page 270.

* The estimated cost has been increased from 19 million dollars to 21 million dollars to allow for the conversion of the vessel from a "flush-deck" type of carrier to an "island" type of carrier during construction.

† Formerly Collier Jupiter, converted 1937 into aircraft tender.

UNITED STATES.—Cruisers.

Class.	NAME.	Standard Displacement. tons.	Length. (Extreme). ft.	Beam. ft.	Draft ft.	Horse-Power, Type of Machinery and Boilers.	Where Built.	Date of Launch.	Date of Completion.	Cost (exclusive of armament). £	Armour.		Armament.		Speed. knots.	Fuel. Coal. Oil.	Complement.
											Belt. Deck.	Gun Position.	Guns.	Torpedo Tubes.			
Phoenix Class	Phoenix	10,000 esti- mated	600 (onw.l.)	61	19 9	100,000 (G.)	N.Y.S. Co., Camden	1938	2,395,000	..	in.	in	15 6-in., 8 5-in., 4 seaplanes, 2 catapults.	..	32½	Oil	..
	Boise						Newport News	1936	2,330,000	..	5	..					
	Honolulu						N.Y. Navy Yard	1937	..	..	3	..			
	St. Louis						Newport News	1938	est.	..	..	..		
	Helena						N.Y. Navy Yard	1938	1939	..	..	..		
Wichita Class	Atlanta	8,000 About 8,000	Bldg.	6-in. guns.
	San Juan						..	..	..	..	..	..
	Juneau						..	Proj'd.	..	..	..	..	
	San Diego						Philadelphia Navy Yard	1937	..	..	..	..	
Brooklyn Class	Wichita	10,000 esti- mated	600 (onw.l.)	61½	19½	100,000 (G.)	Philadelphia Navy Yard	1937	9 8-in., 8 5-in. A.A., 2 3-pr., 10 smaller, 2 catapults, 4 aircraft.	None	32½	Oil	..
	Savannah						N.Y.S. Co., Camden	1937	1938	..	..	..		
	Nashville						N.Y.S. Co., Camden	1937	..	2,410,000 estimated	..	..			
	Brooklyn						New York Navy Yard	1938	1938	..	..	..		
Quincy Class	Philadelphia	9,400	588	61½	19½	107,000 P.T. (G.)	Philadelphia Navy Yard	1937	1937	2,410,000 estimated	15 6-in., 8 5-in., A.A. 4 sea- planes, 2 catapults.	None	32½	Oil	..
	Vincennes						Bethlehem S. B. Corp., Quincy	1936	1936	1,860,000 estimated	..	..			
	Quincy						..	1935	1936					620

UNITED STATES.—Cruisers—continued.

Class.	NAME.	Standard Displacement, tons.	Length, (Battre), ft.	Beam, ft.	Draft, ft.	Horse-Power, Type of Machinery and Boilers.	Where built.	Date of Launch.	Date of Completion.	Cost (exclusive of armament), \$		Armour.		Armament.		Speed, knots.	Fuel, Coal, Oil, tons.	Complement.
												Belt, Deck.	Gun, Tor.	Guns.	Torped. Tubes.			
Omaha Class	Trenton	7050	555½	55½	13½	90,000 P.T.	{ Philadelphia (Cramp) Wash. Tacoma, Wash. Bethlehem S.B. Co., Quincy Philadelphis (Cramp) New York S.B. Co. Navy Yard, New York	1923	1924	1,823,000	2	in.	..	12 6-in. (53 cal.) (Marblehead, 11 6-in.), 4 3-in. (50 cal.) A.A.; 2 3-pr., 2 catapults, 2 floatplanes, 30 mines	6 21-in. (T.)	33.7	— 1800	450
	Marblehead							1923	1924	1,810,000	3	3	..	10 6-in. (53 cal.) (Omaha, 12 6-in.), 4 3-in. (50 cal.) A.A.; 2 3-pr., 2 catapults, 2 floatplanes, 30 mines	6 21-in. (T.)	33.7	— 1800	450
	Memphis							1924	1925	1,838,000	1½	1½	..	10 6-in. (53 cal.) (Omaha, 12 6-in.), 4 3-in. (50 cal.) A.A.; 2 3-pr., 2 catapults, 2 floatplanes, 30 mines	6 21-in. (T.)	33.7	— 1800	450
	Milwaukee							1921	1923	1,794,000	1½	1½	..	10 6-in. (53 cal.) (Omaha, 12 6-in.), 4 3-in. (50 cal.) A.A.; 2 3-pr., 2 catapults, 2 floatplanes, 30 mines	6 21-in. (T.)	33.7	— 1800	450
Pensacola Class	Omaha	7050	555½	55½	13½	90,000 P.T. (G.)	{ Tacoma, Wash. Bethlehem S.B. Co., Quincy Philadelphis (Cramp) New York S.B. Co. Navy Yard, New York	1920	1923	1,823,000	3	3	..	10 6-in. (53 cal.) (Omaha, 12 6-in.), 4 3-in. (50 cal.) A.A.; 2 3-pr., 2 catapults, 2 floatplanes, 30 mines	6 21-in. (T.)	33.7	— 1800	450
	Raleigh							1923	1924	1,616,000	1½	1½	..	10 6-in. (53 cal.) (Omaha, 12 6-in.), 4 3-in. (50 cal.) A.A.; 2 3-pr., 2 catapults, 2 floatplanes, 30 mines	6 21-in. (T.)	33.7	— 1800	450
	Richmond							1921	1923	1,742,000	1½	1½	..	10 6-in. (53 cal.) (Omaha, 12 6-in.), 4 3-in. (50 cal.) A.A.; 2 3-pr., 2 catapults, 2 floatplanes, 30 mines	6 21-in. (T.)	33.7	— 1800	450
	Salt Lake City							1929	1929	3,400,000	3	3	..	10 8-in. (55 cal.), 4 5-in. (25 cal.) A.A.; 2 3-pr., 2 catapults, 4 planes	6 21-in. (T.)	32.7	— 3000	603
	Pensacola.	9100	585½	65½	16	107,000 P.T. (G.)	{ New York S.B. Co. Navy Yard, New York	1929	1930	3,400,000	1½	1½	..	10 8-in. (55 cal.), 4 5-in. (25 cal.) A.A.; 2 3-pr., 2 catapults, 4 planes	6 21-in. (T.)	32.7	— 3000	603

GUNBOATS.—Tulsa (1923), and Asheville (1920), 1270 tons, 12 knots, 3 4-in., 2 3-pr., 3 1-pr.; Sacramento (1914), 1140 tons, 12½ knots, 3 4-in., 2 3-pr., 2 1-pr.; and 5 others, used for training purposes; Charleston, and Erie (1936), 2000 tons, 20 knots, 4 6-in., 4 m.g., 1 seaplane.

RIVER GUNBOATS.—Guam (1927), Tutuila (1928), 370 tons, 14 knots, 2 3-in., 10 m.; Monocacy (1914), 180 tons, 13½ knots, 2 3-in., 7 m.; Luzon, Mindanao (1928), 560 tons, 16 knots, 2 3-in., 10 m.; Oahu (1928), 450 tons, 15 knots, 2 3-in., 10 m.

MINELAYERS.—Arcostook and Ogala (1918), 4200 tons, 20 knots, 1 5-in., 2 3-in. A.A., 350 mines; 8 light mine-layers, ex-T.B.D.'s, 1160–1190 tons, 35 knots, 4 4-in., 1 3-in. A.A., 80 mines.

MINESWEEPERS.—26 in number, "Bird" class (1918, 1919), 840 tons, 14 knots, 2 3-in. A.A. guns authorised but not carried. 6 more are equipped as submarine salvage vessels (Chewink, Falcon, Mallard, Ortolan, Pigeon and Widgeon, built 1914–18, 1210–1270 tons, 14 knots). Raven, Osprey, 600 tons (building).

AIRCRAFT TENDERS.—Wright (1921), 8675 tons, 15 knots, 2 5-in., 2 3-in. A.A.; Avocet, Gannet, Heron, Lapwing, Pelican, Sandpiper, Swan, Teal, Thrush (1918–1919), 840 tons, 14 knots, 2 3-in. A.A.; Curtiss, Albemarle, 8300 tons (building); Barnegat, Biscayne (building). SUBMARINE CHASERS.—15 in number, 75 tons, 17 knots, 1 3-in. gun.

COAST GUARD CRUISING CUTTERS.—7 in number, 2000 tons, 20 knots, 2 5-in., 2 6-pr., 1 seaplane; 6 in number, 1000 tons, 13½ knots, 2 3-in.; 10 in number, 1500 tons, 16½ knots, 1 5-in., 1 3-in.; 5 in number, 1800 tons, 15 knots, 2 5-in., 1 3-in.; 9 others, 800–1200 tons, 12 knots, 2 3-in.

COAST GUARD PATROL BOATS.—17 in number, 311 tons, 16 knots, 1 3-in., 2 6-pr.; 36 in number, 200 tons, 10 knots, 1 3-in.; 15 in number, 45 tons, 22 knots; 58 in number, 37 tons, 13½ knots, 1 1-pr.

RADIO-CONTROLLED TARGET SHIPS.—Boggs, Lamberton (ex-Destroyers); Utah (ex-Battleship). OTHERS.—6 in number, 14 knots, 4 5-in.; 5 in number, 10–11 knots, 2 5-in.; 6 others; 1 building, 16½ knots, 8000 tons.

AMMUNITION SHIPS.—Pyro, Nitro, 10,000 tons, 13 knots, 4 5-in., 2 3-in. DESTROYER TENDERS.—Dobbin (12,450 tons); Whitney (12,450 tons), and Melville (7150 tons), 16 knots, 8 5-in.; Altair, Denebola and Rigel, 7,600 tons, 10½ knots, 4 5-in., 4 3-in. A.A.; Black Hawk, 8900 tons, 13 knots, 4 5-in.; Bridgeport, 11,750 tons, 12½ knots, 8 5-in.; Dixie, Prairie, 9000 tons (building).

SUBMARINE TENDERS.—Holland (1926), 11,570 tons, 16 knots, 8 5-in., 4 3-in. A.A.; 2 6-pr.; Bushnell (1915), 2900 tons, 14 knots, 4 5-in.; Canopus (1919), 6000 tons, 13 knots, 2 5-in., 4 3-in. A.A.; Camden (1900), 7596 tons, 12 knots, 4 4-in., 2 3-pr.; Beaver (1910), 5320 tons, 16½ knots, 4 5-in., 2 1-pr.; Argonne (1921), 8400 tons, 15½ knots, 2 6-pr. Fulton (building), 9000 tons.

REPAIR SHIPS.—Medusa (1924), 8125 tons, 16 knots, 4 5-in., 2 3-in. A.A., 2 6-pr.; Vestal, Prometheus (1909), 6625 tons, 16 knots, 4 5-in., 1 3-in.

TRAINING SHIPS.—Wyoming (1912), 26,000 tons, demilitarised.

4 Store ships, 5 Cargo ships, 2 Transports, 1 Hospital ship, 11 Patrol vessels (Eagle class, 430 tons, 18 knots, 2 4-in., 1 3-in. A.A.), Craneship; Kearsage (capacity 250 tons), 2 survey vessels, and other auxiliaries.

SHIPS OF THE LESSER NAVIES

Albania.—Four motor launches, Durres, Tirane, Vlone and Siranda (built in Italy, 1928), 40 tons, 17 knots, one 3-in. 2 m.

Bulgaria.—Patrol vessels : Derzki, Khrabri, Letoutschy, Shumni, Smyeli, Strogi (1907–8), 100 tons, 26 knots, 3 3-pr. Motor boats : Nos. 1, 2, 77 tons, 17 knots, 2 6-pr. ; Capitan Minkoff, Conductor Dokizanoff, Minior, Vzrif. Two Minesweepers.

China.—Cruisers : *Ping Hai (Shanghai, 1932), 2,500 tons (360 ft. x 39 ft. x 12 ft.), 10,500 H.P., 24 knots, six 5.5-in., six 3.1-in. and eight machine guns, four 21-in. torpedo tubes in pairs. Carry two seaplanes ; Chao Ho and Ying Jui, built by Vickers Armstrongs 1912, 2,500 tons, 6,000 H.P., 20 knots, two 6-in., four 4-in., two 3-in., six 3-pr., two 2-pr. A.A. and two 1-pr., two single 18-in. torpedo tubes ; Hai Yung, Hai Chen and Hai Chou, built at Stettin 1898, 3,000 tons, 7,500 H.P., 19 knots, three 6-in., eight 4-in., four 3-prs. and smaller guns, mount one submerged 14-in. bow torpedo tube ; Hai Chi (Elswick, 1898), 4,300 tons, 17,000 H.P., 24 knots, two 8-in., ten 4.7-in., twelve 3-prs., six machine guns and four small guns, five 18-in. torpedo tubes. Tung Chi (Foochow, 1896), now used as a training cruiser, 1,900 tons, 1,600 H.P., 10½ knots, two 6-in., five 4-in. and eleven smaller guns. Sloops : *Yat Sen (1931), 1,650 tons, 4,000 H.P., 20 knots, one 6-in., one 5.5-in., four 3-in. A.A., two 3-pr., four machine guns ; Hsien Ning (Shanghai, 1928), 418 tons, 2,500 H.P., 16 knots, one 4.7-in., two 3-in., three 6-prs., five machine guns ; Yung Chien, Yung Chi (Shanghai, 1915), 870 tons, 1,350 H.P., 13 knots, one 4-in., one 3-in., four 3-prs. and three smaller guns. Gunboats : Yung Sui (Shanghai, 1929), 600 tons, 4,000 H.P., 18 knots, one 6-in., one 4.7-in., three 3-in. A.A., and eight smaller guns ; Min Sen, Min Chuan (Shanghai, 1931), 465 tons, 16 knots, one 4.7-in., one 4-in., one 3-in. A.A., and two 6-prs. Chang Ning, Cheng Ning, Wu Ning, Sui Ning, Wei Ning, Su Ning, Kiang Ning, Hai Ning (1933–34), 300 tons, 11 knots, two 2½-in, 3 m. Old Gunboats : Chung Shan and Yung Hsiang (Kobe, 1913), 830 tons, 19½ knots, one 4-in., one 3-in. ; Chu Yu, Chu Yiu, Chu Chien, Chu Kuan, Chu Tung and Chu Tai (Kobe, 1907), 700 tons, 11 knots, two 4.7-in., two 3-in. and some smaller guns. Destroyers : Tung An, Kien Kang (1912), 390 tons, 32 knots, two 3-in., four 1.85-in., two 18-in. torpedo tubes. Torpedo boats : Hu Peng, Hu Ying, Hu Chun (1908), 96 tons, 23 knots, one 1.85-in., one 1.5-in., three 14-in. torpedo tubes. Ten patrol boats of 300 tons armed with 6 prs. Fourteen river gunboats. There are in addition a few gunboats and miscellaneous vessels belonging to the water police of Canton province.

* In Japanese hands.

Fifteen motor torpedo boats built by Thornycroft, 1936-8, two torpedoes, four machine guns, 45 knots. Two Italian M.T.B.'s. The new construction programme is reported to include two gunboats, ten motor torpedo boats, four destroyers and four submarines. China at present has no submarines.

Colombia.—Gunboats: Presidente Mosquera, 200 tons; Cartagena, Santa Marta, Barranquilla (Yarrow's, 1930), 140 tons, length 137½ ft., speed 13½ knots, two 3-in. A.A. The following two destroyers were purchased from Portugal early in 1934, Caldas and Antioquia (1934), 1,282 tons, length 319 ft., beam 31 ft., speed 36 knots, four 4·7-in. guns, three 1½-in. A.A. and eight 21-in. torpedo tubes; built by Yarrow's in Portugal. River gunboats: Mariscal Sucre, 500 tons, Cordobo, 450 tons, four 3-in. Patrol vessels: Junin, Cairabosso and Pehincha, 200 tons, 13 knots. Transports: General Mosquera, 3,500 tons, two 3·5-in.; Bogata, 500 tons, 16 knots, one 3·5-in., two 3-in., 2 m.

Cuba.—Light cruiser, Cuba, 2,055 tons, 6,000 H.P., 18 knots, two 4-in., six 3-in., four 6-pr., four 3-pr., 2 m. Training ship: Patria (1911), 1,200 tons, 16 knots, two 3-in., four 6-pr., four 3-pr. Gunboats: Habana, Pinar del Rio, Villas, Matanzas (1912), 80 tons, 12 knots, one 1-pr.; 24 de Febrero, 10 de Octubre (1911), 218 tons, 12 knots, three 3-pr.; Baire (1906), 500 tons, 14 knots, four 3-in., two 3-pr., 1 m.; Yara (1895), 450 tons, 12 knots, one 3-in., two 6-pr.; 20 de Mayo (1895), 200 tons, 12 knots, two 3-pr., two 1-pr.; Enrique Villuendas (1899), 178 tons, 16 knots, two 3-pr.: Captain Quevedo (1932), 137 tons, 12 knots, two 1-pr., one 3-in. A.A.

Czecho-Slovakia.—Patrol boats: President Masaryk (1932), 200 tons, 1,600 H.P., 16·8 knots, four 3-in. A.A.; four in number, 17 tons, 20 knots, two 3-in., and four in number, 7 tons, 16 knots, 2 m.

Ecuador.—Mine-laying patrol vessels Tarqui (50 tons), and gunboat Abdon Calderon (*ex* Cotopaxi) (1884), 700 tons. Training ship: President Alfaro, 850 tons gross, 16 knots.

Egypt.—Patrol vessels: El Amira Fawzia (1929), 2,640 tons, 14 knots, two 3-pr.; El Amir Farouq (1926), 1,441 tons, 17 knots, one 6-pr., 1 m.; Mabahiss (1930), 618 tons, 11 knots, used for surveying. Training ship: Abdel Monaym (1902), 610 tons, 13½ knots. Inspection vessel and store carrier: Naphtys (1905), 650 tons, 7½ knots. Coastal motor boats: Al Sarea (J. S. White, 1937), 13 tons, 36 knots, one 1·5-in.; 2 c.m.B.'s., 20 tons, 20 knots; Qamar, 23 tons, 11 knots; El Hoot, 24 tons, 7 knots.

Estonia.—Mine-layers Keri and Vaindlo (1914), 50 tons, 9 knots, one 3-pr., minesweepers Sourop and Ristna, 500 tons, 12 knots, one 3-in. gun, one 1-pr.; Tahkona, 45 tons, 12 knots two ice-breakers, and Peipus Lake gunboats Ahti, 144 tons, 10 knots two 2-in. guns, and Tartu, 108 tons, 11 knots, two 1-pr. Torpedo

boat Sulev (*ex*-German A32) (1917), 243 tons, 26 knots, two 3-in., two 18-in. torpedo tubes, 10 mines; gunboat Laene, 400 tons, 12 knots, two 3-pr.; river gunboat Mardus, 100 tons, 10 knots, two 3-in. guns, 2 m. Two submarines, Lembit and Kalev, built at Vickers' 1936, 620 tons surface displacement, 820 tons submerged, 1,200 H.P., 13½ knots on surface, 8½ knots submerged, one 40-mm. A.A. gun, four 21-in. torpedo tubes. One destroyer and three M.T.B.'s are projected.

Finland.—Patrol boats: Uusimaa (1919), and Hämeenmaa (1918), 400 tons, 15 knots, two 4-in. guns, one 1·5-in. A.A.; Karjala (1918) (*ex*-Filin), and Turunmaa (1918) (*ex*-Orlan), 342 tons, 15 knots, two 3-in. guns; 7 M.T.B.'s, 11–13 tons, 25–35 knots, two torpedo tubes; seven ice-breakers, 4 4·7-in. guns, eight minesweepers and eleven motor launches. Two armoured gun-boats (4-in. belt), Väinämöinen and Ilmarinen, length 305 ft., 3,900 tons, 5,000 H.P. (Diesel-electric), 15 knots, four 10-in. guns, eight 4·1-in. guns, built at A/B Maskin and Brobygggnads, Abo (1932–3). Submarines Iku-Turso, Veteinen and Vesihäisi (Abo, 1930), 490/700 tons, speed 14 knots surface, 9 knots submerged, one 3-in. gun, 20 mines, six 21-in. torpedo tubes; Saukko (Helsingfors, 1930), 100/136 tons, two 18-in. torpedo tubes, nine mines; Vesikko (1933), 250/300 tons, 13/7 knots, four 21-in. torpedo tubes, one machine gun. Sailing training-ship Suomen Joutsen (*ex*-German Oldenburg). An ice-breaker is building and two minelayers are projected. Submarine parent ship: Louhi, 640 tons, 11 knots, two 1·85-in., 150 mines.

Hayti.—Special service vessels, Nord Alexis (1891), 1,230 tons, 14 knots, two 4·7-in.; Veretieres (1889), 270 tons, 9 knots; 17 Decembre, 851 tons; Pacifique, 488 tons, 14 knots.

Hungary.—Patrol vessels: Sopron, Debreczen, 138 tons, two 2·75-in., 4 m., 15 knots, complement 44; Kecskemet, Szeged and Győr, 131 tons, four 3-in., 4 m., 15 knots; also twelve motor launches.

Iceland.—Three fishery protection vessels: Aegir, 500 tons, 14 knots, two 6-pr.; Thor, 300 tons, 10 knots, one 2¼-in.; Vifil, 150 tons, one 1·8-in.

Iraq.—Four in number motor patrol vessels, 100 ft. in length, 60 tons, 280 H.P., 12 knots, one 3·7-in. howitzer, 4 m.

Latvia.—Gunboat Virsaitis (*ex*-German M68), 480 tons, 16 knots, two 3-in., two 6-pr., one 3-in. A.A., one torpedo tube; one ice-breaker, Krisjanis Valdemars, 2,250 tons, 14 knots; two submarines (1927), Ronis and Spidola, $\frac{390}{514}$ tons $\frac{\text{surface}}{\text{submerged}}$ displ., $14\frac{1}{4}$ knots, one 3-in. A.A., 2 m., six 18-in. torpedo tubes; two minesweepers, Imanta, Viesturs, 225 tons, 14 knots, one 3-in. A.A., 4 m., thirty mines, completed in 1926; one submarine depot ship, Varonis, formerly an ice breaker, 10 knots; Surveying vessel, Hidrografs (1918), 450 tons, 10 knots.

Lithuania.—Patrol vessel: Prezidentas Smetone (1917), 500 tons, two 3-in. guns, 16 knots.

Manchukuo.—Destroyer: Hai Wei, 755 tons, 31.5 knots, three 4.7-in., six 18-in. torpedo tubes. Gunboats: Chingjen, Tingpien (1935), 290 tons, 13 knots, two 4.7-in., 3 m.; Shun Tien, Yang Min (1934), 270 tons, 12 knots, two 4.7, 3 m.; Ta Tung, Li Min (1933), 65 tons, 10½ knots, 3 m.; Li Chi (1903), 220 tons, 13 knots, one 3-in., 4 m.; Li Sui (1903), 220 tons, 13 knots, two 2¼-in., 2 m.; Kiang Tung, Kuang Ning, Kiang Chin (1900), 200 tons, 9 knots, one 3-in., 4 m. Patrol boats: Haifeng, Hailung (1933), 200 tons, 14 knots, two 3.1 in., 2 m.; Hai Kuang, Hai Sui, Hai Jung, Hai Hua (1933), 42 tons, 12 knots, one 2.24-in., 2 m.; Daichi Kaihen, Daini Kaihen (1933), 42 tons, 15 knots, 2 m. Chi Min (1934), 20 tons, 10 knots, 2 m.; En Min, Hui Min, Pu Min (1933), 15 tons, 10 knots, 2 m.

Mexico.—Coast defence vessel Anahuac (1898), 3,162 tons, 15 knots, two 9.4-in., four 4.7-in., four 6-pr., 2 m., 2 l.; gunboats: Bravo 1,227 tons, 3,000 I.H.P., 12½ knots (Leghorn 1904), two 4-in., four 6-pr.; G20-29 (1934-5), 130 tons, 3,000 H.P., 26 knots, two 25 m.m. A.A. and four 13 m.m. A.A. Armed transport: Durango, built in Spain, 1935, 1,600 tons, 20 knots, 3,000 miles endurance at 15 knots, two 4-in., two twin 1-in. pompoms, two four-barrelled .5-in. machine guns, built to carry 500 men and 80 horses. Three others, Querataro, Potesi and Guanajato, 1,800 tons, 20 knots, three 4-in. and twelve machine guns, to transport 230 men and 20 horses. Patrol vessels: Mazatlán, Acapulco and Veracruz (1920), 486 tons, 8 knots, one 6-pr. and two m.g. Transports: Progreso (1907), 1,590 tons, 13 knots, four 6-pr., five others. Oiler: Mexico, 2,559 tons gross.

Nicaragua.—One gunboat.

Paraguay.—Gunboats: Humayta and Paraguay (1931), 636 tons, 17 knots, four 4.7-in., four 3-in. A.A. guns, 2 m., six mines; two older, Capitan Cabral and Tacuari, 120 tons, completed 1910, one 3-in., two 6-prs., 10 knots. One despatch vessel, with 3-in. gun.

Persia (Iran).—Gunboats: Babr and Palang (Italy, 1932), 950 tons, 205 ft. long, 1,900 H.P. (Diesel), 15 knots, two 4-in. and two 3-in. A.A. guns. Four motor patrol boats built in Italy (1932). Semorg, Chahbaaz, Karkas and Sharock, 330 tons, 900 H.P. (Diesel), 15 knots, two 3-in. guns, 2 m. Gunboats and patrol vessels are for customs work. Motor boats: Azerbaijan, Gehlani, Mazenderan (built in Italy, 1935), 28 tons, 68½ feet. Training ship: Homay, 700 tons; Shahin, 150 tons, 16 knots.

Peru.—Almirante Grau and Coronel Bolognesi, cruisers, 3,200 tons, (Barrow, 1906), two 6-in., eight 3-in., eight maxim, two 18-in. submerged torpedo tubes, 24 knots, converted to oil-

burning 1925, to be fitted as minelayers; also Lima (1880, refitted 1920) (parent ship for submarines), 1,790 tons, 10 knots, three 4-in. Gunboat: America, 200 tons, 14 knots, two 3-pr. Destroyer: Rodriguez, 490 tons, 28 knots, six 9-pr. T.B.D.s: Almirante Guise (*ex-Lennuk*) (1917), 1,400 tons, 35 knots, five 4-in. guns, one 2-pr., nine 18-in. t.r., eighty mines, and Almirante Villar (*ex-Vambola*) (1918), 1,260 tons, 35 knots, four 4-in. guns, two m., one 2-pr., nine 18-in. t.r., eighty mines. Submarines R1-4, built in U.S.A. (1926-9), and R5 and R6 authorised, $\frac{576}{682}$ tons, $\frac{14\frac{1}{2}}{10}$ knots, one 3-in., four torpedo tubes. One vedette boat, the Napo, 98 tons, built by Yarrow, 1921, three 1·8-in., 12 knots. Gunboats: Amazonas and Loreto (1934), 250 tons, 750 H.P., 15 knots, four 1·5-in., two ·8-in., two m.g. Transport vessel: Rimac, 6,848 tons (gross), 12 knots. Oiler: Pariñas, 2,820 tons (gross), 10 knots.

Philippines.—Two M.T.B.'s.

Poland.—Four *ex*-German torpedo boats (355 tons, 20 knots, two 3-in., 18-in. torpedos) for police purposes. Gunboats: Komen-dant Pilsudski and General Haller (1920), 340 tons, 15 knots, two 3-in., 2 m. Training ship: Iskra. River monitors: Warszawa, Horodyszcze, Torun, Pinsk (1920), 110 tons, 9 knots, two 4-in., two 3-in. A.A.; Wilno, Krakow (1926), Niedosciagnona, Niezwyciezona (1934), 70 tons, 9 knots, one 3·9 in., two 3-in. A.A. Twenty motor boats. Two destroyers: Burza, Wicher (1931-2), 1,515 tons, 33,000 H.P., 33 knots, four 5·1-in., one 2·9-in. A.A., six 21·7-in. torpedo tubes. Three submarine minelayers: Rys, Zbik and Wilk (1931-2), $\frac{964}{1,230}$ tons, $\frac{1,800}{1,200}$ H.P., 14 knots surface, 9 knots submerged; one 4-in., one 2-pr., six 21·7-in. torpedo tubes, 40 mines. Mine-sweepers: Jas Kolka, Mewa, Czajka, Rybitwa (1935), 183 tons, 1,040 H.P. (Diesel), 15 knots, one 3-in. gun, 4 m. Two building. Minelayer: Gryf (1938), 2,200 tons, 6,000 H.P. (i.c.), 20 knots, six 4·7-in., four 1·5-in. A.A., two machine guns, 300 mines. Two destroyers: Grom and Blyskavica (1937), 2,000 tons, 39 knots, seven 4·7-in., two 1·57-in. A.A., two triple 21-in. torpedo tubes. Two submarine minelayers building in Holland: Semp, Orzel, 1,000 tons, 2,200 H.P., 19 knots, one 4·2-in., one 1·6-in. gun, and one projected. Transport: Wilja, 8,400 tons, 10 knots. Submarine depot ship: Slawomir Czerwinski, 2,450 tons gross, 12 knots.

Portugal.—The minelayer Vulcano (150 tons) (Thornycroft, 1909), 12 knots. Two sloops, about 1,200 tons, sold out of the British Navy: Carvalho Araujo (*ex-Jonquil*) and Republica (*ex-Gladiolus*), 17 knots, two 4-in., two 3-in. A.A., two 3-pr. Destroyer: Tamega (1913-24), 670 tons, 11,000 H.P., 27 knots, one 4-in., two 3-in., two torpedo tubes. Gunboats: Zaire (1919), Diu and Lagos (1932), Faro (1928), 400 tons, 700 H.P., 13 knots, two 3-in., two 3-pr., and there are 10 older ones.

1st class sloops: Alfonso de Albuquerque and Bartolomeu Diaz

(Hawthorn Leslie, 1935), 1,760 tons, 21 knots, four 4·7-in., two 3-in. A.A., four pompoms, two torpedo tubes, one catapult, one aircraft and forty mines. 2nd class sloops: Goncalo Velho and Goncalves Zarco (Hawthorn Leslie, Newcastle, 1933), 1,045 tons, 2,000 H.P., 16½ knots, three 4·7-in., two 1·5-in. A.A. Pedro Nunes (1935) and João de Lisboa (*ex*-Infante Henrique) (1937), 1,080 tons, 17 knots, two 4·7-in. Destroyers: Vouga and Lima (Yarrow's, Scotstoun, 1933), and Dao and Tejo (built by Yarrow's in Portugal, 1935), 1,282 tons, 33,000 H.P., 36 knots, four 4·7-in., three 1·5-in. A.A., two quadruple 21-in. torpedo tubes, twenty mines. Submarines: Delfin, Espardate and Golfinho (Vickers, 1934-5); surface condition, 800 tons, 2,300 H.P. and 16½ knots; submerged condition, 1,000 tons, 1,000 H.P. and 9½ knots; one 4-in. gun, 2 m., six 21-in. torpedo tubes.

Rumania.—River monitors: Bucovina (1916), 540 tons, 12 knots, two 4·7-in., two 4·7-in. howitzers, two 3-pr., two 11-pr. A.A.; Ardeal (1905), 440 tons, 10 knots, two 4·7-in., one 3-pr., one 3·5-in. A.A.; Basarabia (1915), 530 tons, 12 knots, two 4·7-in., two 3-pr., two 11-pr. A.A.; Lascar Catargiu, Ioan Bratianu, Milhail Kogalniceanu, Alexandru Lahovari (1907-8), 670 tons, 13 knots, three 4·7-in., two 3-pr., one 3-in. A.A., 2 m.

Flotilla leaders: Regele Ferdinand and Regina Maria (Naples, 1930, Thornycroft's design), 1,785 tons, 38 knots, length 334½ ft., five 4·7-in., three 2-pr. A.A., two twin 21-in. torpedo tubes, 50 mines. Marasti, Marasesti (*ex*-Italian Nibbio, Sparviero), 1917-18, 1,460 tons, 35 knots, five 4·7-in., four 3-in. A.A., 2 m., two twin 18-in. torpedo tubes, fifty mines.

Seven vedettes (built in 1908), 50 tons, 18 knots, one 3-pr. gun.

Gunboats: Stihl, Lepri Remus, Dumitrescu, Ghiculescu (1916-17, *ex*-French Magnonne, Friponne, Chiffonne, Impatiente), 350 tons, 15 knots, two 3·9-in., 2 m.

Submarine: Delfinul (Quarnaro, Fiume, 1932). Displacement, 640 tons surface, 900 tons submerged, speed 14 knots surface, 9·5 knots submerged, one 4·2-in. gun, six 21-in. torpedo tubes.

There are also five armed motor boats, police craft (*ex*-Austrian T.B.'s), Naluca, Sborul and Zmeul, and seven armed launches.

A submarine dépôt ship, Constanta, 1,821 tons, 13 knots, two 4-in. A.A. guns (Fiume, 1930).

Training ship, Mircea, 350 tons, 8·5 knots, two 1-pr. Sailing with auxiliary engines.

Siam.—Gunboats: Mongkut Rajakumarn (1887), 700 tons, 11 knots, two 4·7-in., two 6-pr., three 3-pr.; Srma Monthon (1908), 225 tons, 14½ knots, two 6-pr.; Ratnakosindr (1925), 920 tons, two 6-in., four 3-in. H.A., 12 knots; Sugrib (1900), 580 tons, 11·5 knots, one 4·7-in., five 6-pr., 2 m.; Sukhodaya (Vickers, 1930), 1,030 tons, 13 knots, two 6-in., four 3-in. A.A. Destroyer: Phra Ruan (*ex*-British Radiant, 1917), 719 tons, 35 knots, three 4-in. Six 55-ft. Thornycroft M.T.B.'s, 37-40 tons, two 18-in. torpedoes, two Lewis guns. Nine torpedo boats built in Italy (1936-37), 460 tons, 32

knots, three 3-in. guns, 4 m., six 18-in. torpedo tubes. Training ship Chao Phra (1919), 840 tons, 16 knots. Four 370-ton submarines are building in Japan. Two minelayers (1936), Italian built, 408 tons, 18 knots, two 3-in. Three patrol vessels (1936), built in Japan, 110 tons, 18 knots, one 3-in., 4 m., two 18-in. torpedo tubes. Tug Pi-Sua-Maar, 165 tons, $9\frac{1}{2}$ knots. Transports: Vides Kichkar (1902), 850 tons; Amgthong (1918), 15 knots; Oiler, Sumui (1936), 1,854 tons, 12 knots. Three fishery protection vessels (1936), 50 tons, $9\frac{1}{2}$ knots, one 1.5-in. Building programme includes two coast defence gunboats, two sloops, four submarines, one minelayer. Seven torpedo boats and two cruisers building in Italy.

Turkey.—The battle-cruiser Yavouz Sultan Selim (1912) (*ex*-Goeben), 22,734 tons, 27 knots; armament: ten 11-in., ten 5.9-in., eight 3.5-in., four 1.5-in. p.p., 2 m., 1 l., four submerged 19.7-in. torpedo tubes. Light cruisers: Hamidieh (Elswick, 1904), 3,830 tons, speed 22 knots; armament: two 5.9-in., six 3-in., eight 3-in. a.a., two 18-in. torpedo tubes, seventy mines; Medjidieh (Philadelphia, 1903), refitted 1927, 3,300 tons, speed 22 knots; armament: four 5.1-in., two 3-in. a.a., 4 m. Destroyers: Adatepe, Kocatepe (Ansaldo, Italy, 1932), 1,310 tons, 43 knots, four 4.7-in., three 2-pr. a.a. guns, six 21-in. tubes. Tinaztepe and Zafer (Cantiere Navale del Tirreno, Italy, 1932), 1,840 tons, 38 knots, four 4.7-in. guns, three 2-pr. a.a., six 21-in. torpedo tubes. Submarines: Ikindji-in-Uni and Birindjiin-Uni (Fijenoord, Rotterdam, 1928), $\frac{433}{556}$ tons, $\frac{13\frac{3}{4}}{9\frac{3}{4}}$ knots, one 3-in.,

1 m., six 18-in. torpedo tubes. Dumlupinar (minelayer) (Monfalcone, 1932), 950 tons, 15 knots, 2,400 H.P. surface, 1,200 tons, $9\frac{1}{2}$ knots, 1,400 H.P. submerged, one 4-in. a.a., four torpedo tubes, forty mines. Sakarya (Montfalcone, 1932), $\frac{610}{940}$ tons, 15 knots, 1,500 H.P. surface, 925 tons, $9\frac{1}{2}$ knots, 1,100 H.P. submerged, one 4-in., six 21-in. torpedo tubes. Three motor launches (1931), 32 tons, 34 knots, one 3-in., two torpedoes, four motor launches, 11 knots, 2 m. Torpedo gunboats: Peikei-Shevket and Beru-i-Satwet (1906), 840 tons, 22 knots, two 4-in., four 6-pr., three 18-in. torpedo tubes. Minesweepers, three in number, 413 tons, three 3-in., two 3-pr., 14 knots. Minelayer, Yardim (1913), 360 tons, 15 knots, twenty-five mines. Depot ships: Erkin, 9,400 tons gross, $12\frac{1}{2}$ knots; Torghud Reis, 9,842 tons. Building programme includes two 8,000-ton cruisers, four destroyers, four submarines and four minelayers.

Uruguay.—Torpedo-gunboat (training ship) Uruguay (1910), 1,150 tons, 23 knots, two 4.7-in., four 3-in., six 1-pr., two 18-in. torpedo tubes. Surveying ship Capitan Miranda (1930), 516 tons, 12 knots. Training ship, 18 de Julio, 680 tons, 12 knots. Three coastguard patrol boats: Paysandu, Salto, and Rio Negro, built in Italy, 1935, 150 tons, 1,150 H.P. (Diesel), 16 knots, two 3-in., two machine guns. Armed tugs: Vanguardia (1908), 95 tons, 12 knots, two 1.5-in.; Corsario, 130 tons, 10 knots, two 1.5-in.

Venezuela.—Old gunboats : Mariscal Sucre, 1,125 tons, 13 knots, two 4-in., two 6-pr. ; General Salom (750 tons), one 3-in., four 6-pr., 12 knots ; Miranda (200 tons), Brion (150 tons). Armed tug José Felix Ribas, two 6-pr. Armed yacht Maracay. Minelayers : General Soubllette, General Urdaneya.

Yugoslavia.—Submarines Hrabri and Nebojsca, completed at Armstrong's 1928, displacement 870 tons surface, 1,146 tons submerged, speed 15 knots surface, 10 knots submerged, mount two 4-in., six 21-in. torpedo tubes. Smeli and Osvetnik, completed at Nantes, 1929, displacement 570 tons surface, 797 tons submerged, speed 14·5 knots surface, 9·25 knots submerged, carry one 4-in., one 2-pr. and six 21-in. torpedo tubes. Old cruiser Dalmacija (*ex*-German Niobe), refitted 1926, 2,370 tons, six 3-in., is used as a gunnery and general training ship. There are four *ex*-Austrian river monitors, Vardar, Drava, Sava, Morava, 400–530 tons, mounting two 4·7-in. and smaller guns ; eight *ex*-Austrian T.B.'s, 260 tons, 28 knots, two 2·5-in. ; two patrol boats, 36 tons ; six minelayers (*ex*-German, 1918), 330–512 tons, 15 knots, two 3·9-in., forty mines ; five minesweepers, 120 tons, 9 knots ; one minesweeper, 78 tons, 17 knots ; one seaplane depôt ship, Zmaj (built at Hamburg, 1929), 1,870 tons, 15 knots ; one training ship (1931), 720 tons, 8 knots ; two submarine depôt ships (1895), and auxiliary craft.

One flotilla leader, Dubrovnik, built at Yarrow's, Scotstoun, completed 1932, length 371 feet, displacement 1,880 tons, 42,000 S.H.P., speed 37 knots, carries four 5·5-in., two 3·4-in. A.A., six 1·5-in. A.A., two twin 2-pr., two triple 21-in. torpedo tubes and forty mines.

M.T.B.s : Two Thornycroft (1927), 15 tons, 40 knots, 1 m., two 18-in. torpedo tubes, four depth charges. Eight built at Lursen (1936–37), 60 tons, 34 knots, one 1·5-in. A.A., two torpedo tubes.

Destroyers : Beograd, Zagreb, Ljubljana (building), 1,210 tons, 38 knots, four 4·7-in., six 21·7-in. torpedo tubes. Flotilla leader (building).

BRITISH AND FOREIGN FLOTILLAS.

Great Britain.

Name or Number.	Built by.	Completed.	Dimensions.			Number of Screws.	Standard Displacement.	Horse-Power.	Mean Speed on Trial, or expected.	Armament.	Torpedo Tubes.	Complement (War).
			Length (Extreme).	Beam.	Draught.							
FLOTILLA LEADERS.												
			ft. ins.	ft. ins.	ft. ins.		Tons.		Knots.			
Tribal Class :												
Ashanti	Denny	1938										
Bedouin	Bldg.											
Eskimo	Vickers,	1938										
Mashona	Walker ..	Bldg.										
Matabele	Scotts	Bldg.								8 4.7-in. guns	1 Q.	200
Punjabi	Stephen ..	Bldg.								7 smaller	21"	
Sikh	Stephen ..	1938										
Somali	Swan Hunter ..	1938		36 6	...	2	1870	44,000	36½			
Tartar	Bldg.											
Afridi	Vickers-Arm-	1938										
Cossack	strongs	1938										
Ghurka	Fairfields	1938										
Maori		1938										
Mohawk		1938								8 4.7-in. guns.	1 Q.	200
Nubian	Thornycroft	1938									21"	
Zulu	Stephen & Sons	1938										
Inglefield ..	Cammell Laird	1937		34 0	...	2	1530		36½			
Hardy		1936					1505	38,000	36½			
Grenville ..	Yarrow	1936	330	34 6	8 0	2	1485		36½	5 4.7-in.	2 Q.	175
Faulknor ..	Yarrow	1935					1460		36½	2.5-in. M.	21"	175
Exmouth ..	Portsmouth	1934	343	33 9	8 8	2	1475	38,000	36½	5 smaller.		125
	Dockyard											
Duncan	Portsmouth	1933	329	33 0	8 8	2	1400	36,000	35½	4 4.7-in.	2 Q.	175
	Dockyard									1 3-in. A.A.		
Kempenfelt ..	J. S. White ..	1932	329	33 0	8 7	...	1390	36,000	35½	22-pr., 1 M., 4 L.	2 Q.	175
Keith	Vickers	1931	323	32 3	8 6	2	1400	34,000	35½	4 4.7 in., 2 2-prs.	2 Q.	175
										1 M., 4 L.		
Codrington ..	Swan Hunter ..	1930	343	33 9	10 0	2	1540	39,000	35	5 4.7-in., 2 2-prs.	2 Q.	185
										1 M., 4 L.	21"	
Wallace	Thornycroft	1919										
Keppel	"	1925	329	31 11	12 4	2	1480	40,000	36	5 4.7-in.	2 T.	182
Broke, ex-Rooke	"	1925								1 3-in. A.A.	21"	
										2 2-pr. A.A.		
Douglas		1918								1 M., 4 L.		
Campbell		1918										
Mackay, ex-Claverhouse	Cammell Laird ..	1919	332 6	31 9	12 3	2	1530	40,000	36.5	5 4.7-in.	2 T.	182
Malcolm		1919								1 3-in. A.A.	21"	
Montrose	Hawthorn Leslie	1918								2 2-pr. A.A.		
										1 M., 4 L.		

DESTROYERS.

Name or Number.	Built by.	Completed.	Dimensions.			Number of Screws.	Standard Displacement.	Horse-Power.	Mean Speed on Trial, or expected.	Armament.	Torpedo Tubes.	Complement (War).
			Length (Extreme.)	Beam.	Draught.							
			Feet.	ft. ins.	ft. ins.		Tons.		Knots.			
<i>Laforey, Kelly, Javelin, Intrepid, Hero, Greyhound, Fearless, Eclipse, Defender, Beagle, & Acasta Classes:</i>												
Laforey	Yarrow .. ..	..	..	..	..	..	1935	..	..	4.7 in.	..	..
Lance	Yarrow											
Larne	Cammell Laird ..											
Legion	Hawthorn Leslie											
Lightning ..	Cammell Laird						1920	..	..	4.7 in.	..	..
Lively	Scotts											
Lookout ..												
Loyal	H'wthorn Leslie	..	..	..	..	..	1695					
Kelly	John Brown ..											
Kashmir	Denny											
Kandahar ..	Fairfield											
Kelvin	Swan Hunter ..	Bldg.	..	35 0	..	..	1690	40,000	36	6 4.7 in. guns	10	..
Khartoum ..	Thornycroft									7 smaller	21"	
Kimberley ..	White											
Kingston ..	Yarrow											
Kipling	John Brown ..											
Jackal	Denny											
Jaguar	Fairfield											
Jamaica	Swan Hunter ..	Bldg.	..	35 0	..	..	1690	40,000	36	6 4.7 in. guns	10	175
Janus	Thornycroft									7 smaller	21"	
Javelin	J. S. White ..											
Jersey	H'wthorn Leslie											
Jervis	Yarrow											
Jupiter												

Torpedo tubes : T. = triple

Q. = quadruple.

Great Britain—continued.

Name or Number.	Built by.	Completed.	Dimensions.			Number of Screws.	Standard Displacement.	Horse-Power.	Mean Speed on Trial, or expected.	Armament.	Torpedo Tubes.	Complement (War).			
			Length (extreme).	Beam.	Draught.										
DESTROYERS—															
<i>Javelin, etc., Classes</i>															
—continued.															
Icarus ..	J. Brown ..	1937	323	33	8½	2	1370	34,000	36	4 4·7-in guns 7 smaller	10 21"	145			
Ilex ..															
Isis ..	Yarrow ..														
Ivanhoe ..															
Imogen ..	Hawthorn Leslie	1936	323	33 0	8 6	2	1340	34,000	36	4 4·7 in. 7 smaller	2 Q. 21"	145			
Imperial ..															
Intrepid ..	J. S. White														
Impulsive ..	Vickers														
Hero ..	(Parsons)	1936	323	33 3	8 6	2	1335	34,000	36	4·7-in. 2·5-in. M. 5 smaller	2 Q. 21"	145			
Hereward ..	Scotts ..														
Hostile ..															
Hotspur ..	Denny ..														
Hasty ..		1936	323	33 3	8 6	2	1335	34,000	36	4·7-in. 2·5-in. M. 5 smaller	2 Q. 21"	145			
Havock ..	Swan Hunter														
Hunter ..	Vickers-Armstrong														
Hyperion ..	Griffin														
Greyhound ..	Fairfields	1936	323	33 3	8 6	2	1335	34,000	36	4·7-in. 2·5-in. M. 5 smaller	2 Q. 21"	145			
Gipsy ..															
Gallant ..	Stephen & Sons														
Grenade ..															
Grafton ..	Thornycroft	1935	329	33 3	8 6	2	1350	36,000	36	4 4·7-in. 2·5-in. M. 5 smaller.	2 Q. 21"	145			
Glowworm ..															
Fearless ..	Cammell Laird														
Foresight ..															
Foxhound ..	Brown	1935	329	33 3	8 6	2	1350	36,000	36	4 4·7-in. 2·5-in. M. 5 smaller.	2 Q. 21"	145			
Fortune ..	J. S. White														
Forester ..	Parsons/Vickers-Armstrong														
Fury ..															
Fame ..	Denny ..	1934	329	33 3	8 6	2	1375	36,000	36	4 4·7-in. 2·5-in. M. G. 5 smaller.	2 Q. 21"	145			
Firedrake ..															
Eclipse ..	Scotts ..														
Echo ..															
Escapade ..	Hawthorn Leslie	1932— 1933	317½ (b p.)	33	8 6	2	1375	36,000	36	4 4·7-in. 2·5-in. A.A. 7 smaller	2 Q. 21"	145			
Escort ..															
Electra ..	Swan Hunter														
Encounter ..	Vickers-Armstrong														
Esk ..	Thornycroft	1931	323	32½	8½	2	1360	34,000	35½	4 4·7-in., 2 2-pr. 1 M., 4 L.	2 Q. 21"	140			
Express ..															
Defender ..	Hawthorn, Leslie														
Diamond ..															
Daring ..	Brown ..	1930	323	32½	8½	2	1350	34,000	35½	4 4·7-in., 2 2-pr. 1 M., 4 L.	2 Q. 21"	140			
Decoy ..															
Dainty ..	Hawthorn Leslie														
Delight ..															
Diana ..	Palmers ..	1930	323	32½	8½	2	1350	34,000	35½	4 4·7 in., 2 2-pr. 1 M., 4 L.	2 Q. 21"	140			
Duchess ..															
Basilisk ..	Brown ..														
Beagle ..															
Blanche ..	Hawthorn, Leslie	1930	323	32½	8½	2	1350	34,000	35½	4 4·7 in., 2 2-pr. 1 M., 4 L.	2 Q. 21"	140			
Boadicea ..															
Boreas ..	Palmers ..														
Brazen ..															
Brilliant ..	Swan, Hunter	1930	323	32½	8½	2	1350	34,000	35½	4 4·7 in., 2 2-pr. 1 M., 4 L.	2 Q. 21"	140			
Bulldog ..															
Acasta ..	Brown ..														
Achates ..															
Acheron ..	Thornycroft	1930	323	32½	8½	2	1350	34,000	35½	4 4·7 in., 2 2-pr. 1 M., 4 L.	2 Q. 21"	140			
Active ..	Hawthorn Leslie														
Antelope ..															
Anthony ..	Scotts ..														
Ardent ..		1930	323	32½	8½	2	1350	34,000	35½	4 4·7 in., 2 2-pr. 1 M., 4 L.	2 Q. 21"	140			
Arrow ..	Vickers-Armstr.														
<i>Thornycroft Type:</i>															
Amazon ..	Thornycroft	1927	323	31½	9	2	1350	39,500	37	4 4·7-in., 2 2-pr. 1 M., 4 L.	2 T. 21"	140			
<i>Yarrow Type:</i>															
Ambuscade ..	Yarrow ..	1927	322	31	8½	2	1170	33,000	37						

Torpedo tubes: T. = triple. Q. = quadruple.

Great Britain—continued.

Name or Number.	Built by.	Completed.	Dimensions			Number of Screws.	Standards Displacement.	Horse-Power.	Mean Speed on Trial, or expected.	Armament.	Torpedo Tubes.	Complement (War).										
			Length. (Extreme)	Beam.	Draught.																	
			Feet.	Feet.	Feet.		Tons.		Knots.													
DESTROYERS—																						
Admiralty "S" Class:																						
Saladin	Stephen ..	1919	276	26½	10½	2	905	27,000	36	3 4-in., 1 2-pr., 1 M., 4 L.	2 D. 21"	103										
Sardonyx	" ..	1919																				
Scimitar	Brown ..	1918																				
Tenedos	Haw. Leslie ..	1919																				
Thanet	" ..	1919																				
Thracian	" ..	1922																				
Stronghold	Scott ..	1919																				
Sturdy	" ..	1919																				
Scout	Brown ..	1918																				
Shikari	{Doxford } {Chatham }	1924																				
Admiralty "V" Class:																						
Vansittart	Beardmore ..	1919	312	29½	10½	2	1120	27,000	34	4 4·7 in., 2 2-pr., 1 M., 4 L.	2 T.	130										
Venomous	Brown ..	1919																				
Verity	" ..	1919																				
Volunteer	Denny ..	1919																				
Veteran	Brown ..	1919																				
Wanderer	Fairfield ..	1919																				
Wren	Yarrow ..	1923																				
Whitshed	Swan Hunter ..	1919																				
Wild Swan	" ..	1919																				
Witherington ..	J. S. White ..	1919	312	29½	10½	2	1120	27,000	34	4 4-in., 1 2-pr., 1 M., 4 L.	2 T.	120										
Wivern	" ..	1919																				
Wolverine	" ..	1920																				
Worcester	" ..	1922																				
Whitehall	{Swan Hunter } {Chatham }	1925																				
Walpole	Doxford ..	1918																				
†Whitley	" ..	1918																				
Wryneck	Palmer ..	1918																				
Windsor	Scott ..	1918																				
Wrestler	Swan Hunter ..	1918	312	29½	10·7	2	1100	27,000	34	4 4-in., 1 2-pr., 1 M., 4 L.	2 T.	120										
Wessex	Haw. Leslie ..	1918																				
Winchester	J. S. White ..	1918																				
Wolfhound	Fairfield ..	1918																				
Westminster ..	Scott ..	1918																				
Westcott	Denny ..	1918																				
Wakeful	Brown ..	1917																				
Walker	Denny ..	1918																				
Warwick	Haw. Leslie ..	1918																				
Watchman	Brown ..	1918	312	29½	10·7	2	1100	27,000	34	4 4-in., 1 2-pr., 1 M., 4 L.	2 T. 21"	120										
Whirlwind	Swan, Hunter..	1918																				
Winchelsea	J. S. White ..	1918																				
Vanessa	Beardmore ..	1918																				
Vanity	" ..	1918																				
Vidette	Stephen ..	1918																				
Vivien	Yarrow ..	1918																				
Valentine	C. Laird ..	1917																				
Valorous	Denny ..	1917																				
Vimy (late Van-couver)	Beardmore ..	1918								4 4-in., 1 2-pr., 1 M., 4 L.	2 T.	120										
Vanoc	Brown ..	1917	312	29½	10½	2	1090	27,000	34	4 4-in., 1 2-pr., 1 M., 4 L.	{ 1 T. 1 D. 3	1 T., 1 D. 2 T.										
Vanquisher	" ..	1917																				
Vega	Doxford ..	1917																				
Velox	" ..	1918																				
Venetia	Fairfield ..	1917																				
Verdun	Haw. Leslie ..	1917																				
Versatile	" ..	1918																				
Vesper	Stephen ..	1918																				
Vimiera	Swan Hunter ..	1917																				
Vivacious	Yarrow ..	1917	312	30½	10½	2	1120	30,000	35	{ 4 4-in., 1 2-pr., 1 M., 4 L.	2 T.	120										
Vortigern	J. S. White ..	1918																				
Thornycroft "V" Class:																						
Witch	{Thornycroft } {Devonport }	1924											312	30½	10·9	2	1140	30,000	35	{ 4 4·7 in., 2 2-pr., 1 M., 4 L.	2 T.	130
Wishart	Thornycroft ..	1920																				
Woolston	" ..	1918																				
Wolsey	" ..																					
Viceroy	" ..																					
Viscount	" ..																					
Admiralty "R" Class:																						
Skate	Brown ..	1917	276- 276½	26½	10½	2	900	27,000	36	3 4-in., 1 2-pr., 1 M., 4 L.	2 D. 21"	98										

Torpedo tubes: D=double. T.=triple.

† Is being converted into an Escort Vessel and will be armed with 4 4-in. guns.

Great Britain—continued.

SUBMARINES.

Name or Number.	Where Built.	Completed.	Dimensions.			No. of Screws.	Displacement.	Horse-Power.	Maximum Speed.	Armament.	Torpedo Tubes.	Complement (War).				
			Length (Extreme)	Beam.	Draught.											
			Feet.	Feet.	Feet.		Tons.		Knots.							
Unity Class :																
Undine ..	} Vickers ..	1938	..	..	..	..	540	615	11½	2 small guns	6	27
Unity ..							730	825	10							
Ursula ..																
Triton Class :																
Tetrach ..	Vickers	Bldg.	..	..	..	..	1,090	..	..	4-in.	..	..		
Talisman ..	Cammell Laird	Bldg.					1,575									
Torbay ..	Chatham	Bldg.														
Triton ..	Vickers-Armstrong	1938	..	..	..	..	1,090	2,500	15½	1 4-in. gun	6	..
Thetis ..	Cammell Laird	1938					1,575	1,450	9							
Triumph ..																
Trident ..																
Tribune ..	Vickers	..	..	..	..	..	..	..	..	..	..
Thistle ..																
Taku ..																
Tarpon ..	Cammell Laird	Bldg.	..	..	..	..	1,090	..	..	..	..	..
Triad ..	Scott's	Bldg.														
Truant ..	Vickers	Bldg.														
Tuna ..	Scott's	..	..	..	..	..	..	..	..	..	..	..
Tigris ..	Chatham															
Thames Class :																
Thames ..	Vickers-Armstrong	1932	345	28	13'5	2	1,805	10,000	21½	1 4-in., 2 smaller	6	60				
Severn ..	Vickers-Armstrong	1935	345	28	13'7	2	2,680	2,500	10							
Clyde ..	Armstrong						1,850	10,000	22½							
Porpoise Class :*																
Porpoise ..	Vickers-Armstrong	1933	289	29'8	13'8	..	1,500	3,300	15	1 4-in., 2 smaller	6	55				
Grampus ..	Chatham	1937	271½	25½	15	2	2,053	1,630	8½							
Narwhal ..	Chatham	1935					1,520	3,300	15½							
Rorqual ..	Vickers	1935					2,157	1,630	8½	1 4-in., 2 smaller	6	55				
Cachalot ..	Scott's	1938	..	..	..	..	..	..	..
Seal ..	Chatham	Bldg.														
Swordfish Class :																
Sunfish ..	Chatham	1937	208'7	24	10'5	2	670	1,900	15	1 3-in., 1 smaller	6	40				
Sterlet ..		1938					960	1,800	10							
Spearfish ..		1936														
Seawolf ..	Scott's	1938	208'7	24	10'5	2	670	1,550	13½	1 3-in., 1 smaller	6	40				
Salmon ..	Cammell Laird	1938					960	1,800	10							
Snapper ..	Chatham	1935														
Shark ..	Chatham	1934	202'5	24	10'5	2	640	1,550	13½	1 3-in., 1 smaller	6	40				
Sealion ..	Cammell Laird	1934					927	1,800	10							
Sturgeon ..	Chatham	1933														
Starfish ..	Chatham	1933	..	..	..	..	..	..	..	..	..	..
Seahorse ..	Chatham	1933														
Swordfish ..	Chatham	1932														
Rainbow Class :																
Rainbow ..	Chatham	1932	290	29'8	13'8	2	1,475	2,035	17½	1 4-in., 2 smaller	8	53				
Regent ..	Vickers-Armstrong	1930														
Regulus ..	Vickers-Armstrong	1930														
Rover ..	Vickers-Armstrong	1931														
Parthian Class :																
Parthian ..	Chatham	1931	290	29'8	13'7	..	1,475	4,400	17½	1 4-in., 2 smaller	8	53				
Perseus ..	Vickers-Armstrong	1930					2,040	1,320	9							
Proteus ..	Vickers-Armstrong															
Pandora ..	Vickers-Armstrong															
Phoenix ..	Cammell Laird	1931														
Odin Class :																
Odin ..	Chatham	1929	283½	29'8	13'7	..	1,475	4,400	17½	1 4-in., 2 Lewis	8	53				
Olympus ..	Beardmore	1930					2,038	1,320	9							
Orpheus ..	Beardmore	1930														
Osiris ..	Vickers	1929														
Oswald ..	Vickers	..	..	..	..	..	..	..	..	..	..	..
Otus ..	Vickers															
Oberon Class :																
Oberon ..	Chatham	1927	270	28	13'2	..	1,311	2,950	15	1 4-in., 2 Lewis	8	53				
Oxley ..	Vickers	1927	275	27'7	13'3	..	1,830	1,350	9							
Otway ..	Vickers	1927	275	27'7	13'3	..	1,354	3,000	15½	1 4-in., 2 Lewis	8	53				
	Vickers	1927	275	27'7	13'3	..	1,872	1,350	9							
L Class :																
L27 ..	Vickers	1926	238½	23½	11'7	..	760	2,400	17½	1 4-in., 1 Lewis	4	41				
L26 ..	Vickers	1926					1,080	1,600	10½							
L23 ..	Vickers	1924														

* Minelaying submarines.

Great Britain—continued.

SUBMARINES—continued.

Name or Number.	Where Built.	Completed.	Dimensions.			No. of Screws.	Displacement.	Horse-Power.	Maximum Speed.	Armament.	Torpedo Tubes.	Complement (War).
			Length. (Extreme)	Beam.	Draught.							
			Feet.	Feet.	Feet.		Tons.		Knots.			
H Class:												
H50	Beardmore ..	1920	171	15.75	12.5	2	410 500	480 320	13 10½	1 Lewis	4	23
H49	Beardmore ..	1919										
H44	Armstrong ..	1920										
H43	Armstrong ..	1919										
H34	Cammell Laird	1919										
H33	Cammell Laird	1919										
H32	Vickers ..	1919										
H31	Vickers ..	1919										
H28	Vickers ..	1918										

SLOOPS

Name.	Displacement.	Length (extreme).	Beam (extreme).	Draught.	Horse-Power.	Where built.	Maker of Machinery.	Date of Launch.	Date of Completion.	Armament.	Speed (knots).	Complement.
		ft. ins.	ft. ins.	ft. ins.								
SLOOPS.												
<i>Convoy</i>												
<i>Escorts:</i>												
Egret	1200	282	..	8 6	3,600	J. S. White Denny Thornycroft Doxford	J. S. White Denny Thornycroft Doxford	1917	1918	8 4-in., 5 smaller 4 4-in. H.A. 2 smaller. 6 4-in. H.A. 10 smaller	19½	34
Auckland ..												
Pelican ..	1100	312	29 7	10 8								
Whitley ..												
Black	1250	..	..	..	4,300	Yarrow	Yarrow	Bldg.				19½
Swan												
Flamingo ..												
<i>Convoy</i>												
<i>Sloops:</i>												
Enchantress ..	1085	282	37 0	8 6	3,300	J. Brown	J. Brown	1934	1935	4 4.7-in. guns.	18½	125
*Stork	1100							1936	1936	4-3 pr.		
Bittern	1190	282	37 0	8 6	3,300	Denny J. S. White	Denny	1938	Bldg.	1 small gun 6 4.7-in.	18½	..
<i>Coastal</i>												
<i>Sloops:</i>												
Kingfisher ..	510	234 b.p.	26 6	6 6	3,600	Fairfield	Fairfield	1935	1935	1 4-in. gun. 8 smaller	20	..
Mallard .. ..	..	..	..	..	..	Stephen	..	..	1936		20	60
Puffin .. ..	..	..	..	..	..	Thornycroft	..	..	1937		20	..
Sheldrake ..	530	..	..	..	..	Yarrow	..	..	1938		20	..
Kittiwake ..	..	..	..	..	..		
Widgeon .. ..	..	..	..	..	..		
Guillemot ..	580								Bldg.			
Pintail												
Shearwater ..												
<i>Grimsby</i>												
<i>Class:</i>												
Grimsby	990	266	36 0	7 6	2,000	{ Devonport Devonport Devonport Chatham }	J. S. White	1933 1935 1934 1935	1934 1935 1935 1935	{ 2 4.7-in. guns. 1 3-in. 12 smaller 3 4-in. 12 smaller 4 4-in. 12 smaller }	16½	100
†Leith												
Lowestoft ..												
†Wellington ..												
Londonderry ..	990	..	..	..	..	{ Devonport Devonport }	Thornycroft	1935	Bldg.			
Deptford												
Aberdeen	990	..	..	..	..	{ Devonport Devonport }						
Fleetwood ..												
SLOOP MINE-SWEEPERS.												
<i>Halcyon</i>												
<i>Class:</i>												
Halcyon	815	246	33 6	7 3	1,770	{ J. Brown Thornycroft }	J. Brown Thornycroft	1934	1934	{ 2 4-in., 5 smaller }	17	80
Skipjack												
Harrier						Hamilton	Beardmore	1935	1935			
Hussar												
Speedwell ..	815	246	33 6	7 7	2,000	J. S. White	J. S. White	1935	1936	{ 2 4-in. 9 smaller }	17	80
Niger												
Salamander ..						{ Devonport Devonport }	..	1936	1937 1937 1937	{ 2 4-in. 5 smaller }	..	..
Hebe												
Sharp-shooter ..	..	..	..	..	..		
Hazard .. ..	..	..	..	..	..	{ Wm. Gray	..	1937	1938	..	..	..
*Gleaner												

* Will be employed as surveying vessels and will carry 1 small gun only.

† In addition to her normal duties Enchantress will be made available for occasional use by the Board of Admiralty.

‡ Attached to New Zealand Division.

Great Britain—continued.

SLOOPS—continued.

Name.	Displacement.	Length (extreme).	Beam (extreme).	Draught.	Horse-Power.	Where Built.	Maker of Machinery.	Date of Launch.	Date of Completion.	Armament.	Speed (knots).	Complement.
		ft. ins.	ft. ins.	ft. ins.								
<i>Halcyon</i> Class—cont.												
Gossamer	815	..	..	..	1,750	Hamilton's Devonport	Stephen Richardsons, Westgarth	1937	1938	2 4-in. H.A. 5 smaller	17	
Leda	830	..	..	..	..	Ailsa	Thornycroft	1937	1938	..	17	
Seagull	..	..	..	..	..	Caledon	Parsons					
Franklin	..	..	..	..	..	Devonport	Barclay Curle					
Jason	875	..	..	..	1,750	Devonport	Barclay Curle	1938	Bldg.	2 4-in. H.A. 5 smaller	17	..
Scott						J. Hamilton	J. S. White					
Bramble						J. Hamilton	J. S. White					
Britomart												
Speedy												
Sphinx												
<i>Shoreham</i> Class :												
Repeat Shore- ham Class :												
Falmouth.												
Milford	1060	281 4	35 0	8 3	2,000 P.T. (G.)	Devonport	Hawthorn Leslie Yarrow Yarrow	1932	1932	2 4-in. A.A. 4 3-pr. 8 L.	100 16½	..
Weston						Chatham	Hawthorn Leslie	1933	1933			
Dundee												
Bideford						Devonport	J. S. White & Devonport	1931	1931			
Rochester.						Chatham	J. S. White & Chatham	1932	1932	1 4-in., 1 4-in. A.A. 4 3-pr. 8 L.	100 16½	..
Fowey	1105	281 4	35 0	8 0	2,000 P.T. (G.)	Devonport	J. S. White & Devonport	1930	1931			
Shoreham.						Chatham	J. S. White & Chatham	1930	1931	Fowey 2 4-in. H.A. 13 smaller guns		
<i>Hastings</i> Class :												
Hastings	1025					Devonport	Devonport	1930	1931	1 4-in., 1 4-in. A.A. 4 3-pr. 8 L.	16½	..
Penzance						Devonport	Devonport	1930	1931			
Folkestone						Swan,	Hawthorn, Leslie	1930	1930			
Scar- borough	1045	266 4	34 1	9 1	2,000 P.T. (G.)	Hunter Swan, Hunter	Hawthorn, Leslie	1930	1930	Hastings 2 4-in., 9 smaller		
<i>Bridgewater</i> Class :												
Bridgewater	1045	266 4	34 0	8 6	2,000 P.T. (G.)	Hawthorn Leslie	Hawthorn Leslie	1928	1929	2 4-in. A.A. Bridgewater 10 smaller, Sand- wich 11 smaller	16½	95
Sandwich												
<i>Arabis Class :</i>												
Lupin†	1175	267 9	33 6	12 0	2,000 recip.	Simons	Simons	1916	1916	1 4-in., 1 2-pr., 8 L.	16 -17	100
Rosemary						Richardson Duck	Blair	1915	1916	1 4-in., 2 2-pr. 2 M., 8 L.		
<i>Acacia Class :</i>												
Foxglove	1165	262 6	33 0	12 6	1,800 recip.	Dunlop Bremner	Dunlop Bremner	1915	1915	2 4-in., 4 3-pr. 2 2-pr., 8 L.	16-17	100

† Converted to oil-burning.

Great Britain—continued.

TWIN-SCREW MINESWEEPERS, RIVER GUNBOATS.

Name.	Displacement.	Length (extreme).	Beam (extreme).	Draught.	Horse-Power.	Where built.	Maker of Machinery.	Date of Launch.	Date of Completion.	Armament.	Speed (knots).	Complement.
TWIN-SCREW MINE-SWEEPERS.												
Aberdare . . .						Ailsa	Ailsa	1918	1918	1 4-in., 1 12-pr. A.A. Alresford, Caterham, Ross and Saltburn no armament.	16	73
Abingdon . . .						Ailsa	G. Clark	1918	1919			
Albury . . .						Ailsa	Ailsa	1918	1919			
Alresford . . .						Ailsa	W. H. Allen	1919	1919			
Bagshot . . .						Ardrossan Dry Dock Co.	W. H. Allen	1918	1919			
Derby . . .						Clyde S.B. Co.	Clyde S.B. Co.	1918	1918			
Dundalk . . .						Do.	Do.					
Dunoon . . .						Do.	Do.					
Fermoy . . .						Dundee S.B. Co.	Cooper & Greig	1919	1919			
Fareham . . .						Dunlop, Bremner	Dunlop, Bremner	1918	1918			
Elgin . . .	710	231 0	28 7	9 0	2,200 recip.	Simons	Simons	1918	1918			
Sutton . . .						McMillan	Yarrow					
Saltash . . .						Murdock & Murray	Do.	1918	1919			
Saltburn . . .						Do.	Do.					
Selkirk . . .						Do.	D. Rowan	1918	1919			
Ross . . .						Lobnitz	Lobnitz	1919	1919			
Widnes . . .						Napier & Miller	Rowan					
Harrow . . .						Eltringham	Wallsend Slipway	1918	1918			
Huntley . . .						Do.	Eltringham	1919	1919			
Lydd . . .						Fairfield	Fairfield	1918	1919			
Stoke . . .						C. Rennold- son	Shields Eng. Co.	1918	1918			
Pangbourne . .						Lobnitz	Lobnitz					
Tedworth . . .	675	231 0	28 0	9 0	1,800 recip.	Simons	Simons	1917	1917	1 3-in. A.A.	16	35
RIVER GUN-BOATS.												
Scorpion . . .	700	208 9	34 3	..	4,500	J. S. White	White	1937	1938	2 4-in., 1 3.7-in. Howitzer, 12 smaller	17	..
Robin . . .	226	150 b.p.	26 8	3 0	800 recip.	Yarrow	Yarrow	1934	1934	2 4-in., 1 3.7-in. Howitzer, 10 smaller	12½	35
Dragonfly . . .	585				3,800	Thornycroft	Thornycroft			2 4-in., 1 3.7-in. Howitzer, 10 smaller	17	..
Grasshopper . .												
Sandpiper . . .	185	160 0 b.p.	30 8	1 10	600 recip.	Thornycroft	Thornycroft	1933	1933	1 3.7-in. Howit- zer, 1 6-pr., 8 L.	11½	35
Locust . . .	585					Yarrow	Yarrow	Bldg.		4-in.		
Mosquito . . .	372	150 0	28 8	4 9	2,250 (G.)	Yarrow	Yarrow	1931	1931	1 3.7-in. Howit- zer, 2 6-pr., 8 L.	15	55
Falcon . . .												
Gannet . . .	310	185 0	29 0	4 0	2,250 (G.)	Yarrow	Yarrow	1927	1928	2 3-in. A.A., 8 L.	16	60
Petrel . . .								1927	1927			
Seamew . . .	262	168 0	27 0	4 0	1,370 (G.)	Do.	Do.	1928	1928		14	60
Tern . . .								1927	1927			
Aphis . . .						Ailsa	Ailsa	1915	1915	2 6-in., 1 3-in. A.A., 1 2-pr., 8 L.		
* Bee . . .						Do.	Do.	1915	1916	1 3-in. A.A., 2 3-pr., 1 2-pr., 8 L.		
Cicala . . .						Barclay Curle	Barclay Curle	1915	1916	2 6-in., 1 3-in. A.A., 1 2-pr., 8 L.		
Cockchafer . .						Do.	Do.	1915	1916	2 6-in., 1 3-in. A.A., 8 L.		
Cricket . . .						Do.	Do.	1915	1916	2 6-in., 1 3-in. A.A., 1 2-pr., 8 L.		
Grat . . .	625	237 6	36 0	4 6	2,000 recip.	Lobnitz	Lobnitz	1915	1915	2 6-in., 1 3-in. A.A., 1 2-pr., 8 L.	14	55
Ladybird . . .						Do.	Do.	1915	1916	2 6-in., 1 3-in. A.A., 1 2-pr., 8 L.		
Mantis . . .						Sunderland S.B. Co.	N.E. Marine	1915	1915	2 6-in., 1 3-in. A.A., 1 2-pr., 8 L.		
Moth . . .						Do.	Do.	1915	1916	2 6-in., 1 3-in. A.A., 1 2-pr., 8 L.		
Scarab . . .						Wood, Skin- ner	Do.	1915	1915			
Tarantula . . .						Do.	Do.	1915	1916	1 6-in., 1 3-in. A.A., 1 2-pr., 8 L.		

• To pay off.

Argentine Republic.

Name or Number.	Where Built.	Launched	Dimensions.			Number of Screws.	Displacement.	Horse-Power.	Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel.	
			Length. (Extreme.)	Beam.	Draught.								Coal	Oil
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.	
FLOTILLA LEADERS—														
Cervantes (ex-Spanish Churrucay)	Cartagena ..	1925	318	31½	10½	2	1522	42,000	36	5 4·7 in., 1 3-in. A.A., 4 M	2 triple 21-in.	—	—	—
Juan de Garay (ex-Spanish Galliano)		1925	318	31½	10½	2	1522	42,000	36	5 4·7 in., 1 3-in. A.A., 4 M	2 triple 21-in.	—	—	—
Mendoza ..	J. S. White, Covos	1928							86	5 4·7 in., 1 3-in. A.A., 2 2-pr., 4 M.	2 triple 21-in.	160	—	—
La Rioja ..		1929	335	31·8	12½	2	1466	45,000	(La Rioja 39·4 f.)	5 4·7 in., 1 3-in. A.A., 2 2-pr., 4 M.	2 triple 21-in.	160	—	—
Tucuman ..		1929	335	31·8	12½	2	1466	45,000	39·4 f.)	5 4·7 in., 1 3-in. A.A., 2 2-pr., 4 M.	2 triple 21-in.	160	—	—
DESTROYERS—														
Catamarca ..	Schichau ..	1911	288·7	27½	10	2	972	28,000	32	3 4-in. 2 1-pr.	4 21-in.	100	220	—
Jujuy † ..	Germania ..	1910	295½	29·5	10	..	1000	28,000	34·7 f.	3 4-in. 2 1-pr.	4 21-in.	100	220	—
Cordoba * ..	Schichau ..	1911	295½	29·5	10	..	1000	28,000	34·7 f.	3 4-in. 2 1-pr.	4 21-in.	100	220	—
La Plata † ..	Germania ..	1911	295½	29·5	10	..	1000	28,000	34·7 f.	3 4-in. 2 1-pr.	4 21-in.	100	220	—
San Juan ..	J. Brown ..	1937	323	33	8½	..	1350	34,000	35½	4 4·7 in., 8 smaller	2Q 21-in.	150	450	—
San Luis ..	J. Brown ..	1937	323	33	8½	..	1350	34,000	35½	4 4·7 in., 8 smaller	2Q 21-in.	150	450	—
Misiones ..	Cammell	1937	323	33	8½	..	1350	34,000	35½	4 4·7 in., 8 smaller	2Q 21-in.	150	450	—
Santa Cruz ..	Laird	1937	323	33	8½	..	1350	34,000	35½	4 4·7 in., 8 smaller	2Q 21-in.	150	450	—
Buenos Aires ..	Vickers, Barrow	1937	323	33	8½	..	1350	34,000	35½	4 4·7 in., 8 smaller	2Q 21-in.	150	450	—
Entre Rios ..	Vickers, Barrow	1937	323	33	8½	..	1350	34,000	35½	4 4·7 in., 8 smaller	2Q 21-in.	150	450	—
Corrientes ..	Vickers, Barrow	1937	323	33	8½	..	1350	34,000	35½	4 4·7 in., 8 smaller	2Q 21-in.	150	450	—
SUBMARINES—														
Santa Fe ..	Taranto ..	1931	226½	21½	13	2	850	3,000	17·5	1 4·7-in.	8	41	—	—
Salta ..	Taranto ..	1932	226½	21½	13	2	850	3,000	17·5	1 4·7-in.	8	41	—	—
Santiago del Estero	Taranto ..	1933	226½	21½	13	2	1080	1,300	9	1 2-pr. A.A.	21-in.	—	—	—

* Converted to oil-burning, 1927, at Buenos Aires.

† Converted to oil-burning at Buenos Aires.

Torpedo tubes: Q = quadruple.

Brazil.

Name or Number.	Where Built.	Launched.	Dimensions.			Number of Screws.	Displacement.	Horse-Power.	Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel.	
			Length (Extreme.)	Beam.	Draught.								Coal	Oil
			Feet.	Feet.	Feet.	Tons.			Knots.				Tons.	
DESTROYERS—														
Plabuy	Yarrow ..	1908	240 p.p.	23·6	7·5	2	560	8,000	27 (27·1- 28·7 on trials)	2 4-in., 4 3 prs.	2 18-in.	75	140 —	
Matto Grosso		1908												
Parahyba		1909												
Rio Grande del Norte		1909												
Santa Catharina ..		1909												
Sergipe		1909												
Maranhao (ex-Porto)	Thornycroft..	1913	265·3	26·5	10	2	934	22,500	31	{ 3 4-in., 1 2-pr.	2 dble. 21-in.	..	— 260	—
Greenhalgh	Ilha das Cobras Rio de Janeiro	Bldg.	360	34·8	9·9	2	1500	42,800	36	5 5-in. 4 M. A.A.	3 Q 21-in.	..	— 500	
Marcello Dias .. .														
Mariz e Barros ..														
SUBMARINES—														
Humayta	Spezia (Ansaldo Fiat)	1927	282	25·6	14	2	1450 1884	4,800 2,200	18·5 10	{ 14-in. A.A.; carries mines	{ 6 21-in.	55	— 140	
Tamova	Spezia (Orlando)	1937	197½	21	14½	..	620 855	1350 800	14 8					
Tymbira														
Tupy														
3 Building														

5 Destroyers building by Vickers and 4 by Thornycroft.

Chile.

Name or Number.	Where Built.	Launched.	Dimensions.			Number of Screws.	Displacement.	Horse-Power.	Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel.	
			Length. (Extreme.)	Beam.	Draught.								Coal	Oil
			Feet.	Feet.	Feet.		Tons.		Knots.					Tons.
DESTROYERS—														
Serrano	Thornycroft's	1923	300	29	9	2	1090	28,000	35	3 4·7-in., 1 3-in.	2 triple 21-in.	130	—	340
Orella														
Riquelme														
Hyatt														
Videla														
Aldea	White.. ..	{ 1912 1913	320 p.p.	32·6	11·1	3	1850	30,000	31	6 4-in. 4 m.	4 18-in.	190	427 80	—
Almirante Lynch, Almirante Condell														
SUBMARINES—														
Capitan Thompson	Vickers Arm- strong's	1929	275	27·5	14·8	2	1520	2750	15	1 4-in.	8 21-in.	54	200	—
Almirante Simpson		1929					1990	1300	9					
Capitan O'Brien ..		1928												
H 1, Gualcola	Fore River, U.S.A.	1915	150·3	15·75	12·3	2	355	480	13	..	4 18-in.	22	—	17·5
H 2, Tequilda							470	640	11					
H 3, Rucumilla														
H 4, Cuale														
H 5, Quidora														
H 6, Frezia														

3 submarines are projected (no money voted).

Denmark.

Name or Number.	Where built.	Launched.	Dimensions.			Number of Screws.	Displacement.	Horse Power.	Speed.	Armament.	Torpedo Tubes	Complement.	Fuel.	
			Length (Extreme).	Beam.	Draught.								Coal	Oil
TORPEDO BOATS.														
FIRST CLASS—														
T4. Glentin	Royal Dockyard, Copenhagen	1934	198·9	19·5	7·8	2	285	6,000	27½	2 3·4-in., 2·78 m., 2 m.	6 17·7 in.	51	—	40
T5. Hogen														
T6. Ornen														
T3. Laxen		1930	198·9	19·5	7·4	2	281	6,000	27½	2 3-in., 2·78 m., 2 m.	8 17·7 in.	51	—	26
T1. Dragen		1929												
T2. Hvalen		1930												
R4. Havkatten †		1919	126·3	13·9	9	2	110	2,000	24·6½	2 6-pr. A.A.	(1 in R2-4)	24	15	—
R5. Sælen †		1919												
R3. Nordkaperen †		1918												
R2. Makrelen †		1918	126·3	13·9	9	2	110	2,000	24·3	2 6-pr. A.A.	18"	1 24	15	—
S6. Narhvalen* ..		1917												
S5. Havhesten* ..		1917												
S4. Söhunden* ..		1917	148·2	16·9	7·5	2	158	3,480	26·2½	1 3-in., 1 m.	4 18"	34	29	—
S2. Stören* ..		1916												
S1. Springeren* ..		1916												
P1. Hvalrossen †		1913	126·3	15	9	2	110	2,000	24·3	2 6-pr. A.A.	18"	1 24	15	—
O1. Sörldderen *	Yarrow & Co.	1911												
SUBMARINES—														
Daphne. D1	Royal Dockyard, Copenhagen	1926	161	16	8·2	2	305	900	13·4	1 3-in. A.A., 1·78 m.	6 18"	25	—	16
Dryaden. D2							380	400	7					
Flora. C3	"	1919	155·7	15·7	9	2	301	900	14·5	1 6-pr. {	5 18"	24	—	13
Bellona. C2							369	640	10·5					
Rota. C1 †	"	..	133·3	13·4	3	2	181	450	13·5	1 6-pr.	3 18"	14	—	9
Galathea. B12							231	340	9·8					
Triton. B10	1914								2 1·5 in.	5 18"	..	..	..
Ran. B9	1915													
Havkalem. E3	"	1937	..	..	..	..	300	..	15 8	2 1·5 in.	5 18"	..	..	..
Havfruen. E2	"	1937	..	..	..	..	300	..	15 8	2 1·5 in.	5 18"	..	..	..
Havmanden. E1	"	1936	..	..	..	..	300	..	15 8	2 1·5 in.	5 18"	..	..	..
E4 projected	"													

* Used as minesweepers.

Used as patrol vessels.

† Rota has one deck tube in addition.

France.

Name or Number.	Where Built.	Launched.	Dimensions.			Number of Screws.	Displacement.	Horse-Power.	Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel.								
			Length. (Extreme.)	Beam.	Draught.								Coal Oil								
FLOTILLA LEADERS—																					
Volta	Ch. de Bre-	1936	451	41'1	15	2	2,884	92,000	38	{ 8 5'4-in., 2 1'5-in. A.A.	10	240	Tons.								
Mogador	tagne, Nantes Lorient	1937											..								
Le Fantastique	Lorient	1934	434½	39½	14	2	2,569	74,000	37	{ 5 5'4-in., 4 1'5-in. A.A.	9	220	—								
L'Audacieux													Ch. de la	21'7	220	650					
Le Malin	Méditerranée	1934									21'7	220	650								
L'Indomptable	Ch. de France																				
Le Triomphant	Ch. de France	1932	424½	39	14	2	2,441	64,000	36	{ 5 5'4-in., 4 1'5-in. A.A.	7	220	—								
Le Terrible													Ch. de la Loire, Nantes	21'7	220	500					
Vauquelin	Ch. de France, Dunkirk	1931									21'7	220	500								
Kersaint	Ch. de la Loire, Nantes													1932	21'7	220	500				
Cassard	Ch. de Bre-	1931				2	2,441	64,000	36	{ 5 5'4-in., 4 1'5-in. A.A.	6	220	—								
Tartu	tagne, Nantes																				
Maillié Brézé	Ch. de la Loire, Nantes	1931									21'7	220	—								
Le Chevalier-Paul	Ch. de Penhoet, St. Nazaire																				
Aigle	Ch. de France, Dunkirk	1932				2	2,436	64,000	36	{ 5 5'4-in., 4 1'5-in. A.A.	6	207	—								
Vantour	Ch. de la Medi-																				
Albatros	terrannée, Havre	1930		40	14	2	2,441	68,000	37	{ 5 5'4-in., 4 1'5-in. A.A.	7	220	—								
Gerfaut	Ch. de la Loire, St. Nazaire																				
Milan	Ch. de Bre-	1930	423	40	14	2	2,441	68,000	37	{ 5 5'4-in., 4 1'5-in. A.A.	7	220	—								
Epervier	tagne, Nantes																				
Valmy	Lorient	1928									21'7	220	—								
Verdun	Ch. de Penhoet, St. Nazaire	1928																			
Vauban	Ch. de la Loire, St. Nazaire	1930	427	39	15	2	2,436	64,000	36	{ 5 5'4-in., 4 1'5-in. A.A.	6	207	—								
Lion	Ch. de France Dunkirk																				
Bison	Lorient	1929	416	37½	17½	2	2,126	55,000	35'5	5 5'1-in.	21'7	206	—								
Guepard	Lorient	1928																			
Chacal	Lorient	1924	346'5	33'5	14'8	2	1,526	44,000	34	{ 4 5'9-in., 2 1'5-in. A.A.	2	180	—								
Jaguar	St. Nazaire ..	1923																			
Leopard	Lorient Dy.	1924	351'7	32'2	10'2	2	1,378	31,000	33	{ 4 5'1-in., 2 1'5-in. A.A.	6	146	—								
Lynx	St. Nazaire ..	1925																			
Panthère	Lorient Dy.	1924	351'7	32'2	10'2	2	1,378	31,000	33	{ 4 5'1-in., 2 1'5-in. A.A.	6	146	—								
Tigre	Nantes	1924																			
Amiral Sérés, ex-German S. 113	Germany	1917																			
DESTROYERS—																					
Le Hardi	Loire	1938	..	..	..	..	1,772	58,000	37	6 5'1-in., 2 1'5-in.	7	21'7	..				
Mameluck	Gironde																				
Epee	Laseyne	1938	351'7	32'2	10'2	2	1,378	31,000	33	{ 4 5'1-in., 2 1'5-in. A.A.	6	146	—								
Lansquenot																					
Casque	Ch. de Graville, Le Havre	1928				2	1,378	31,000	33	{ 4 5'1-in., 2 1'5-in. A.A.	6	146	—								
Fleuret	Ch. Navals																				
Le Corsaire	Français, Caen	1929	351'7	32'2	10'2	2	1,378	31,000	33	{ 4 5'1-in., 2 1'5-in. A.A.	6	146	—								
Le Flibustier	Ch. de Bre-																				
Forbin	tagne, Nantes	1928				2	1,378	31,000	33	{ 4 5'1-in., 2 1'5-in. A.A.	6	146	—								
Frondeur	Ch. de Dyle et Bacalon, Bor-																				
Fougueux	deaux	1929				2	1,378	31,000	33	{ 4 5'1-in., 2 1'5-in. A.A.	6	146	—								
Foudroyant	Maritime																				
Basque	Bordeaux	1929	351'7	32'2	10'2	2	1,378	31,000	33	{ 4 5'1-in., 2 1'5-in. A.A.	6	146	—								
Bordelais	Bordeaux	1928																			
Boulonnais	Caen	1927	351'7	32'2	10'2	2	1,378	31,000	33	{ 4 5'1-in., 2 1'5-in. A.A.	6	146	—								
Brestois	Nantes	1927																			
L'Adroit	Dunkirk	1927	351'7	32'2	10'2	2	1,378	31,000	33	{ 4 5'1-in., 2 1'5-in. A.A.	6	146	—								
L'Alcyon	Bordeaux	1927																			
Le Fortune	Caen	1926	351'7	32'2	10'2	2	1,378	31,000	33	{ 4 5'1-in., 2 1'5-in. A.A.	6	146	—								
Le Mars	Caen																				
La Palme	Nantes	1926				2	1,378	31,000	33	{ 4 5'1-in., 2 1'5-in. A.A.	6	146	—								
La Raillense	Nantes																				

16 destroyers projected.

France—continued.

Name or Number.	Where Built.	Launched.	Dimensions.			Number of Screws.	Displacement.	Horse-Power.	Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel. Coal Oil
			Length. (Extreme.)	Beam.	Draught.								
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons
DESTROYERS—Contd.													
Bourrasque	Dunkerque	1925	347	33·0	13·9	2	1,319	33,000	33	4 5·1-in., 2 1·5-in. A.A.	6 21·7-in.	138	— 300
Cyclone	Havre ..	1925											
Mistral	Caen ..	1924											
Orage	St. Nazaire..	1924											
Ouragon	Rouen ..	1925											
Simoun	Nantes	1925											
Sirocco	Bordeaux ..	1924											
Tempête	Harfleur ..	1925											
Tramontane	Bordeaux ..	1925											
Trombe	Barcelona ..	1925											
Typhon													
Tornado													
L'Azile													
Le Fier													
L'Entrepreant ..	Nantes ..	Bldg.	1000	4 3·9-in.	4		
Le Farouge ..													
Aventurier	Nantes ..	1911	290·5	28·9	11·5	2	915	24,000	27	4 3·9-in.	4 18-in.	140	280 74
TORPEDO BOATS—													
La Melpomène													
La Pomone													
La Flore	Nantes ..	1935	264·9	26·0	9·2	2	610	22,000	34·5	2 3·9-in., 4 M. A.A.	2 21·7-in.	..	— 90
L'Iphegéné													
Bombard	Nantes ..	1936											
Bouclier	Rouen ..	1937											
La Bayonnaise	Bordeaux ..	1936											
La Pourcelante	Dunkirk ..	1936											
La Cordelière	Normand ..	1936											
L'Incomprise	Rouen ..	1937											
Branle-Bas	Normand ..	1937											
Baliste	Dunkirk ..	1937											

1st class torpedo boat (1908), No. 369, 85 tons, 2000 H.P., 26 knots, 1 3-in. gun, 3 torpedo tubes.

Name or Number.	Where Built.	Launched.	Length. (Extreme.)	Beam.	Draught.	Number of Screws.	Displacement.	Horse-Power.	Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel. Coal Oil
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons
CRUISER SUBMARINES—													
Surcouf	Cherbourg ..	1929	361	29·5	23½	2	Surf. Sub. 2880 3004	Surf. Sub. 7600 3400	Surf. Sub. 18 11	2 8-in. 2 1·5-in. A.A.	14 21-in.	150	..
SUBMARINES—													
Roland Morillot ..	Cherbourg ..	Bldg.					1605 2100	..	..	1 3·9-in.	..	..	..
La Praya	Cherbourg ..	Bldg.											
Agosta	Cherbourg ..	1934											
Beveziers	Cherbourg ..	1935											
Ouessant	Brest ..	1936	302	27	16	2	1379 2060	8000 2000	18 10	1 3·9-in., 1 smaller	11	63	..
Sidi-Ferruchi	Ch. de la	1937											
Sfax	Loire ..	1934											
Casabianca	Cherbourg ..	1935											
Le Glorieux	Cherbourg ..	1932											
Le Centaure	Cherbourg ..	1933											
Le Héros	Brest ..	1933											
Le Conquerant	Brest ..	1932											
Le Tonnant	Loire ..	1934											
L'Espoir	Cherbourg ..	1931											
Persée	Ch. Navals												
Protée	Français, Caen												
	Forge et Ch. de												
	la Méditer-												
	ranée la Seyne												
Pégase	Ch. de la Loire,	1930	301·8	27	16	2	1379 2060	6000 2000	18 10	1 3·9-in., 1 1·5-in. A.A.	11	61	— 96
Phénix	St. Nazaire												
	Ch. Dubigeon,												
	Nantes												
Achille	Brest ..	1933											
Ajax													
Acheron	Ch. de la Loire,												
	St. Nazaire												
Argo	Ch. Dubigeon,	1929-1930	301·8	27	16	2	1379 2060	6000 2000	18 10	1 3·9-in., 1 1·5-in. A.A.	11	61	— 96
Acteon	Nantes												

France—continued.

Number and Name.	Where Built.	Launched.	Dimensions.			Number of Screws.	Displacement. Surf./Sub.	Horse-Power.	Speed. Surf./Sub.	Armament.	Torpedo Tubes.	Complement.	Fuel.	
			Length. (Extreme.)	Beam.	Draught.								Coal	Oil
			Feet.	Feet.	Feet.		Tons.		Knots.					Tons.
CRUISER SUBMARINES—														
Contd.														
Pascal	Brest	1928— 1929	302·5	27	16	2	1379 2060	6000 2000	18 10	1 3·9-in., 1 1·5-in. A.A.	11	61	— 96	
Pasteur														
Poncelet														
Henri Poincaré ..														
Archimède	Caen													
Fresnel	Ch. de Penhoet, St. Nazaire													
Monge	Ch. de la Medi- terrannée, la Seyne													
*Perle	Toulon	1933	216·5	23·3	13·5	2	669 910	1300 800- 1000	12 9	1 3-in., 32 mines	5 21·7	40	..	
*Diamant		1933												
*Rubis		1930												
*Nautilus		1928												
*Saphir		1929												
*Turquoise		1929												
Redoubtable ..	Cherbourg ..	1928	302·5	27	16	2	1384 2080	6000 2000	18 10	1 3·9-in. A.A., 1 1-pr. A.A.	11	63	— 96	
Vengeur		1924												
Requin		1925												
Morse	Cherbourg ..	1925	257½	23	17½	2	974 1415	2900 1800	16 10	1 3·9-in. A.A.	10 21·7	54	..	
Narval		1924												
Souffleur		1927												
Caiman	Toulon ..	1926												
Dauphin		1926												
Espadon		1926												
Marsouin	Brest	1924												
Phoque		1926												
SUBMARINES—														
Aurore	Loire	1936	238·3	..	15	2	805	1 3·9-in.
Ceres	Havre ..	Bldg.	210	..	13	2	197	1300	14	1 3-in.	..	43	..	
Pallas														
La Creole														
La Bayadere ..	Le Trait	Bldg.												
La Favorite ..														
L'Africaine ..														
*Emeraude	Toulon ..	1934	224	17½	13	2	597 800	1300 1230	14 9	1 3-in., 2 M	9 21·7	
Minerve	Cherbourg ..	1934												
Juno	Havre ..	1935												
Venus	Worms ..	1935												
Iris	Dubigeon ..	1934												
Orphée	Ch. Normand, Havre	1932	210	20	13	2	558-570 787	1300 1000	14 9	1 3-in., A.A.	6 21·7 2 15·7	43	..	
Oréade		1932												
Orion		1931												
Ondine	Ch. Normand Worms ..	1931												
Psyche		1932												
Sybille		1932												
Vestale	Schneider		216½	20	13	2	565-571 787	1300 1000	14 9·2	1 3-in. A.A.	6 21·7 2 15·7	43	..	
Sultane	Le Trait ..	1932												
Amphitrite ..	Havre ..	1932												
Antiope	Chalons-sur- Saone	1930												
Atalante	Le Trait ..	1932												
Amazone	Chantiers Nor- mand, Havre	1932	204·5	21	12·8	2	552 765	1250 1000	14 9	1 3-in. A.A.	7 21·7 7 21·7	40	..	
Diane		1930												
Meduse		1930												
Argonaute	Schneider et Cie	1929												
Arethuse		1929												
Ariane		1925												
Danaé	Havre ..	1927	204·5	21	12·8	2	576 766	1200 1000	14 9	1 3-in. A.A.	7 21·7 7 21·7	40	..	
Eurydice		1927												
Circe		1925												
Calypso	Chalons ..	1926												
Doris		1927												
Thetis		1927												
Naïde	St. Nazaire	1925	210	21	14½	2	548 744	1700 1000	14 9·5	1 3-in. A.A.	7	39	..	
Sirène		1925												
Nymphe		1926												
Galatée	1925													

French submarines are divided into two classes. 1st class: All vessels of 850 tons and above in the surface condition, including the U minelayers. 2nd class: All smaller vessels.

* Mine-laying submarines.

12 submarines projected.

Germany.

Name or Number.	Where Built.	Launched.	Dimensions.			Number of Screws.	Displacement.	Horse-Power.	Designed Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel.
			Length, (Extreme.)	Beam.	Draught.								Coal Oil
			Feet.	Feet.	Feet.	Tons.			Knots.				Tons.
DESTROYERS—													
(Z 1) Leberech Maass (Z 2) Georg Thiele (Z 3) Max Shultz .. (Z 4) Richard Beitzer (Z 5) Paul Jacobi .. (Z 6) Theodor Riedel (Z 7) Hermann	Deutsche-Werke, Kiel	1935	374	37	9½	..	1625	40,000	36	5 5-in. 4 1½-in., 4 m.	8 21 in.	252	..
(Z 8) Bruno Shoemann (Z 9) Helnemann (Z 10) Wolfgang Zerker (Z 11) Hans Lody .. (Z 12) Bernd von Arnim	Germania-Werft, Kiel	1935	374	37	9½	..	1625	40,000	36	5 5-in. 4 1½-in.	8 21 in.	252	..
(Z 13) Erich Glege (Z 14) Erich Koellner (Z 15) Friedrich Ihn (Z 16) Erich Steinbrück (Z 17) Friedrich Eckoldt Z 18 Hans Roeder	Deschimag, Bremen	1935	374	37	9½	..	1625	40,000	36	5 5-in. 4 1½-in.	8 21 in.	252	..
Z 19 Hermann Z 20 Karl Galster Z 21 Wilhelm Heidkamp Z 22 Anton Schmidt Ilitis .. Wolf .. Tiger .. Luchs .. Jaguar .. Leopard .. Seeadler .. Greif .. Albatros .. Kondor .. Falke .. Möwe ..	Blohm & Voss Hamburg	1935	374	37	9½	..	1625	40,000	36	5 5-in. 4 1½-in.	8 21 in.	252	..
*G. 11 .. *G. 10 .. *G. 8 .. *G. 7 ..	Deschimag, Bremen	Bldg.	385½	38½	9½	..	1811	..	..	..	8 21 in.	..	..
U 1-6, 13-16 .. U 7-12, 17-24 .. U 25-26 .. U 27-32 .. U 33-36 ..	Wilhelms-haven	1927 1927 1928	304	28½	8½	2	800	25,000	34	3 4½-in. 2 1-pr. A.A.	6 19·7 in. (T.)	125	— 300
U 37-44 .. U 45-55 .. U 56-71 ..	Wilhelms-haven	1926 1926 1926 1926 1926	287½	27½	9½	2	800	24,000	33	3 4½-in. 2 1-pr. A.A.	6 19·7 in. (T.)	120	— 300
U 1-6, 13-16 .. U 7-12, 17-24 .. U 25-26 .. U 27-32 .. U 33-36 ..	Germania Werks, Kiel	1911 1912	233+	25	10	2	760	16,000	25	24½-in., 7 m.	2 19·7 in.	85	140 60
TORPEDO BOATS—													
T. 1-12 .. T. 196 .. Klaus von Bavern (ex-T. 190)	..	Bldg.	267	28½	6½	..	600	..	..	1 4½-in. 1 1½-in.	6	..	..
U 1-6, 13-16 .. U 7-12, 17-24 .. U 25-26 .. U 27-32 .. U 33-36 ..	Vulcan Works, Stettin	1911 1910	243	26	10	2	800	18,000	25	24½-in., 2 m.	2 19·7 in.	87	— 200
SUBMARINES—													
U 1-6, 13-16 .. U 7-12, 17-24 .. U 25-26 .. U 27-32 .. U 33-36 ..	Deutsche Werke, Kiel	1935	136½	13	12½	2	250	700	13 7	1 1-pr.	3 21 in.	23	..
U 1-6, 13-16 .. U 7-12, 17-24 .. U 25-26 .. U 27-32 .. U 33-36 ..	Germania Werft, Kiel	1936	232½	20½	13½	..	712	..	18 8	1 4-in. 1 1-pr.	6 21 in.	40	..
U 1-6, 13-16 .. U 7-12, 17-24 .. U 25-26 .. U 27-32 .. U 33-36 ..	Deschimag, Bremen	1936	206½	19	13	..	500	..	16·5 8	1 3½-in. 1 1-pr.	5 21 in.	36	..
U 1-6, 13-16 .. U 7-12, 17-24 .. U 25-26 .. U 27-32 .. U 33-36 ..	Germania Werft, Kiel	Bldg.	..	..	..	..	740	..	..	..	..	..	..
U 1-6, 13-16 .. U 7-12, 17-24 .. U 25-26 .. U 27-32 .. U 33-36 ..	..	Bldg.	..	..	..	..	517	..	..	..	..	..	..
U 1-6, 13-16 .. U 7-12, 17-24 .. U 25-26 .. U 27-32 .. U 33-36 ..	..	Bldg.	..	..	..	..	250	..	..	..	..	..	..

* Classified as torpedo boats in German official lists.

† Length increased during alterations, 1929-30.

A large increase in the German Submarine Fleet is projected.

Name or Number.	Where Built.	Launched.	Dimensions.			Number of Screws.	Displacement.	Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel.
			Length. (Extreme.)	Beam.	Draught								Coal Oil
DESTROYERS—													
Hydra	Odero, Genoa	1931	308·8	30·3	10·5	2	1230	30,000	40	4 4·7 in., 4 2-pr. A.A. 40 mines	6 21-in. (T.)	156	630
Conduriotis													
Spetsai													
Psara													
Thyella	Yarrow ..	1906	220	20·6	9·0	2	305	6006	30	2 3-in. 1 2-pr.	2 18-in.	70	80
Sphendon			320	33	8·5	2	1350						
King Georges I.	Yarrow	1938	320	33	8·5	2	1350	34,000	36	4 4·7-in.	8 21-in.	150	455
Queen Olga													
Niki	Stettin (Vulcan)	1906	220	20·6	9·0	2	275	6000	30	2 3-in., 4 6-pr. ..	2 21-in.	70	90
Aspis			220	20·6	9·0	2	275						
*Aetos, *Leon,	Birkenhead	1911	293	27·7	9·6	2	1013	19,750	32	4 4-in., 2 2-pr. (Panther and Aetos, 40 mines)	6 21-in. (T.)	102	260
*Panther, *Ierax			293	27·7	9·6	2	1013						
TORPEDO BOATS—													
Arethusa	Stettin (Vulcan)	1913	147·8	9	4	2	142	2400	25	2 6-pr.	3 18-in.	..	25
Doris													
†Aigli													
†Alkyoni													
†Pergamos	Fiume	1914	178·4	18·8	5	2	237	5000	28½	1 11-pr.	2 18-in.	25	21 31
†Proussa													
†Kios													
†Kyzikos													
†Kydonia	Monfalcone	1914	178·4	18·8	5	2	237	5000	28½	1 11-pr.	2 18-in.	25	21 31
SUMMARINES—													
Katsons	Schneiders, Harfleur	1926	203½	17·7	12·3	2	567	1300	14	1 4-in., 1	6	30	..
Papanicolis	Ch. de la Loire, Nantes						760	1000	9·5	2-pr. A.A.	21-in.	..	..
Nereus	Ch. de la Loire,	1927	226½	18½	12·6	2	689	1500	14	1 4-in., 1	8	42	..
Proteus	Nantes	1927					945	1200	9·5	2-pr. A.A.	21-in.	..	..
Triton	Nantes	1928					945	1200	9·5	2-pr. A.A.	21-in.	..	..
Glaucos	Ch. de France, Caen	1928					945	1200	9·5	2-pr. A.A.	21-in.	..	..

* Reconstructed by Messrs. J. S. White & Co., Cowes, 1924-25.

† On sale list.

‡ Surrendered Austrian torpedo-boats employed on police duties.

Italy.

FLOTILLA LEADERS—			Feet.	Feet.	Feet.	Tons	Knots			Tons.			
U. Vivaldi	Genoa	1929	353	33·6	10·5	2	1628	50,000	38	6 4·7-in. (in pairs) 4 1·5-in. A.A. Carry mines	6 21-in. (T.)	185	— 600
A. Usodimare	(Odero)	1929											
L. Tarigo	Genoa	1928											
L. Malocello	(Ansaldo)	1929											
L. Pancaldo	Riva Trigoso	1919											
A. Da Noli	(Cant. Navali)	1929											
E. Pessagno	Ancona	1929											
N. Da Recco	(Cant. Navali)	1929											
N. Zeno		1928											
G. Da Verazzano	Fiume ..	1928											
A. da Mosto		1929											
A. Pigafetta		1929											
Leone		1923	372	34	8·8	2	1525	42,000	34	8 4·7-in. (in pairs), 2 3-in. A.A., 60 mines.	6 18-in. (T.)	210	— 350
Pantera	Ansaldo ..	1924											
Tigere		1924											
Aquila	Pattison ..	1916	310	31	9·2	2	{1407 1285}	39,800	36·5	{4 4·7-in. (in pairs), 2 3-in. A.A., 50 mines.	4 18-in. (D.)	140	— 260
Falco	Pattison ..	1916											
Premuda (ex-German V116)	1918	353	34	9·3	2	1526	48,000	36	{4 5·9 in., 2 2-pr. A.A.	4 19·7-in. (D.)	150	— 720
Augusto Riboty	Ansaldo ..	{1915 1914}	340	32	9·8	2	1382	35,000	35	{8 4-in., 4 2-pr. A.A., 100 mines.)	4 18-in. (D.)	150	— 344
DESTROYERS—													
Camelia Nera	Odero-Terni Orlando	1938	350	33·4	10·9	2	1620	48,000	39	4 4·7-in. 4 1·5-in. A.A.	6 21-in.
Ascara													
Corazziere													
Geniere													
Aviere	Cartieri Dell' Tirreno	1938	350	33·4	10·9	2	1620	48,000	39	4 4·7-in. 4 1·5-in. A.A.	6 21-in.
Artigliere													
Carabiniere													
Lanciere													
Granatiere	Riva Trigoso artieri	1938	350	33·4	10·9	2	1620	48,000	39	4 4·7-in. 4 1·5-in. A.A.	6 21-in.
Bersagliere													
Navali													
Rivuti													
Palerino	Cantieri Navali di Ancona	1938	350	33·4	10·9	2	1620	48,000	39	4 4·7-in. 4 1·5-in. A.A.	6 21-in.
Fuciliere													
Alpino													
Lira													
Lupo	Cantiere Naval del Quarnaro Fiume	1937	267	26	7·9	2	679	19,000	34	3 3·9-in. 6 M.	4 18-in.
Lince													
Libra													
Clio													
Calliope	Ansaldo, Genoa	Bldg.	267	26	7·9	2	679	19,000	34	3 3·9-in. 6 M.	4 18-in.
Callipo													
Circe													

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Name or Number.	Where Built.	Launched.	Dimensions.			Number of Screws.	Standard Displacement.	Horse-Power.	Maximum Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel.	
			Length, (Extreme.)	Beam.	Draught.								Coal.	Oil.
			Feet.	Feet.	Feet.		Tons.		Knots.					Tons.
DESTROYERS—Contd.														
Alicione	Ansaldo, Genoa	1933	267	26	7-9	2	679	19,000	34	3 3·9-in. 6 M.	4 18-in.
Alirone														
Ariel														
Aritusa														
Polluce	Naples ..	1937	267	26	7-9	2	679	19,000	34	3 3·9-in. 6 M.	4 18-in.
Partenope														
Plefade														
Pallade														
L. Oriani	Orlando.	1936	343	33½	10	2	1498	48,000	39	4 4·7-in. 41·5-in. A.A. carry mines	6 21-in.	157
V. Alfieri														
V. Gioberti														
Cr. Carducci														
Aldebaran	Ansaldo	1936	267	27	7·6	2	652	19,000	34	3 3·9-in. 61·5-in. A.A.	4 18-in.
Altair														
Andromeda														
Antares														
Canopo	Ancona	1934	264	27	7·5	2	638	19,000	34	3 3·9-in. 61·5-in. A.A.	4 18-in.
Castlopa														
Castore														
Cigno														
Sagittario	Fiume	1934	350	33½	10	2	1449	44,000	38	{ 4 4·7-in., 4 1·5-in. A.A. }	6 21-in.	156
Vega														
Centauro														
Climene														
Sirio	Ancona	1935	269	27	7·2	2	652	19,000	34	3 3·9-in. 6 1·5-in. A.A. guns	4 18-in.
Perseo														
Spica														
Astore														
Maestrale	Fiume	1934	264	27	7·5	2	638	19,000	34	3 3·9-in. 6 1·5-in. A.A.	4 18-in.
Grecale														
Libeccio														
Scirocco														
Dardo	Ancona	1934	350	33½	10	2	1449	44,000	38	{ 4 4·7-in., 4 1·5-in. A.A. }	6 21-in.	156
Strale														
Freccia														
Saetta														
Folgore	Odero, Sestri	1930	315	32	9·5	2	1206	44,000	38	4 4·7-in. 4 M. A.A. 21·5-in. A.A.	6 21-in.	156	— 225	—
Lampo														
Baleno														
Fulmine														
Borea	Quarnaro Yard, Fiume	1932	315	30·5	10	2	1220	44,000	38	4 4·7-in. 4 M. A.A. 21·5-in. A.A.	6 21-in.	150	oil	—
Zeffireo														
Espero														
Ostro														
Aquilone	Ansaldo, Genoa	1927	307½	30	9·5	2	{ 1073 1092 }	35,000	36	{ 4 4·7-in., 3 M., 52 mines 2 1·5-in. A.A. }	6 21-in.	140	— 340	—
Turbine														
Nembo														
Euro														
N. Sauro	Docks Co.	1927	295½	30·2	9·5	2	1058	32,000	35	{ 4 4·7-in., 32-pr. A.A. 3 M., 52 mines 3 4·7-in., 22-pr. A.A. 2 M., 40 mines }	6 21-in.	140	— 340	—
C. Battisti														
F. Nullo														
D. Manin														
Francesco Crispi	Odero	1926	295½	30·2	9·5	2	1058	32,000	35	{ 4 4·7-in., 32-pr. A.A. 3 M., 52 mines 3 4·7-in., 22-pr. A.A. 2 M., 40 mines }	6 21-in.	140	— 340	—
Giovanni Nicotera														
Bettino Ricasoli														
Quintino Sella														
Alessandro Poerio	Naples (Pattison)	1926	278·6	28·2	8·6	2	935	36,000	35	{ 5 4-in., 2 2-pr. A.A. 40 mines }	4 18-in.	106	— 200	—
Gulielmo Pepe														
Insidioso														
Giuseppe Sirtori														
Vicenzo Orsini	Genoa (Ansaldo)	1914	279	26·3	8·0	2	844	20,000	32	{ 5 4-in., 2 2-pr. A.A. 40 mines }	4 18-in.	100	— 250	—
Francesco Stocco														
Giovanni Acerbi														
E. Cosenz														
Glacomio Medici	Naples (Pattison)	1913	239½	24·0	8·4	2	540	13,500	30	{ 5 4-in., 2 2-pr. A.A. 40 mines }	4 18-in.	71	— 110	—
G. La Farina														
Nicola Fabrizi														
Angelo Bassini														
Giacinto Carini	Genoa (Odero)	1917	237¼	24	7·9	2	635	15,500	31-34	{ 4 4-in., 2 3-in., 2 M. 10 mines. }	4 18-in.	100	— 150	—
G. La Masa														
Fratelli Cairoli														
Antonio Mosto														
Giuseppe Abba	Naples (Pattison)	1917	237¼	24	7·9	2	635	15,500	31-34	{ 4 4-in., 2 3-in., 2 M. 10 mines. }	4 18-in.	100	— 150	—
Cesar Rossarol														
cez-German B97														
*Simone Schiaffino														
*Giuseppe Dezza	Genoa (Odero)	1914	236	24	8·8	2	615	13,500	30	{ 5 4-in., 2 2-pr. A.A. 2 M. }	4 18-in.	71	— 150	—
*Giuseppe Missori														
*Gen. A. Cantore														
*Gen. A. Chinotto														
*Gen. A. Papa	Genoa (Odero)	1921	241½	24	7·9	2	635	18,000	30	{ 3 4-in., 2 23-in. A.A. 2 M. }	4 18-in.	100	— 150	—
*Gen. A. Cascino														
*Gen. M. Prestinari														
*Gen. C. Montanari														

[illegible]

* Designated torpedo boats in Italian official lists.

† Minelayer.

† Submarine chaser.

Name or Number.	Where Built.	Launched.	Dimensions.			Number of Screws.	Displacement.	Horse-Power.	Maximum Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel. Coal Oil
			Length. (Extreme.)	Beam.	Draught.								
SUBMARINES—contd.													
Squalo, Narvalo, Delfino, Tricheco	Cantiere N., Triestino	1930	229	19	14.5	2	810 1077	3,000 1,400	16.5 9	1 4-in. 2 m.	8 21-in.	64	..
Argonauta, Fisalia, & Medusa	Cantiere N., Triestino	1931	201.8	18.5	13	2	599 778	1,200 800	14 8.5	1 4-in. 2 m.	6 21-in.
Jalea & Jantina Serpente (ex-Nauti- lus) & Salpa. . . .	Odero-Terni Taranto	1932											
Santorre Santarosa Ciro Menotti	Ansaldo ..	1929	229	19	15.5	2	815 1078 797 1134	3,000 1,300 3,000 1,400	17.5 9	1 4-in. 2 m.	8 21-in.	50	..
Fratelli Bandiera .. Luciano Manara ..	Monfalcone	1929											
Luigi Settembrini .. Ruggiero Settimo ..	Taranto ..	1930											
E. Fieramosca ..	{ Taranto } (Tosi)	1930											
M. Bragadino	Taranto	1929	233	18.6	14	2	1340 1760 802 1051	5,500 2,000 1,500 1,900	19 10 14 8	1 4.7-in. 4 m.	8 21-in.	66	— 80
F. Corridoni	Taranto (Tosi)	1930											
Ballila	Spezia, Ansaldo }	1927	287	25.6	13.5	2	1368 1874	4,400 2,200	18.5 9	1 3.9-in. 4 m. 16 mines	6 21-in.	66	— 140
A. Sciesa.		1928											
E. Toti		1928											
D. Millelire		1927											
V. Pisani.	Montfalcone, Trieste	1927	223	18.7	13.8	2	791 1040	3,000 1,000	17.5 9	1 4-in. 2 m.	6 21-in.	40	— 48
M. Colonna		1927											
Da. Geneys		1928											
G. Bausan		1928											
G. Mameli	Taranto ..	1926	213	21.5	13	2	770 994	3,000 1,000	17 9	1 4-in. 2 m.	6 21-in.	40	— 48
P. Capponi		1927											
T. Speri		1928											
G. Da. Procida ..		1928											
X 2, 3	Ansaldo ..	1916	139.9	18	11	2	390 460	650 360	8 6	{ 1 3 in. A.A. 1 m., 18 mines	{ 2 18-in.	..	— 8
H 1, 2, 4, 6, 8	Vickers ..	1917	150.3	15.8	12	2	336 466	620 480	13 10	{ 1 3-in. A.A. 1 m., H1, 4, and 6 only	{ 4 18-in.	22	— 18

Japan.

Name or Number.	Where Built.	Launched.	Dimensions.			Number of Screws.	Displacement.	Horse-Power.	Maximum Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel.	
			Length (Extreme.)	Beam.	Draught.								Coal	Oil
			Feet.	Feet.	Feet.		Tons.		Knots.					Tons.
DESTROYERS:														
FIRST CLASS—														
Arashio	Kawasaki ..	1937-1938	356	33	9	2	1500	38,000	34	6 5-in.	8 24-in.	200	..	
Oshio	Maizuru ..													
Mitsushio	Fujinagata..													
Asagumo.. .. .	Kawasaki ..													
Minegumo	Fujinagata..													
Kasumi	Uraga													
Yamagumo	Fujinagata..													
Natsugumo	Sasebo													
Arare	Maizuru ..													
Kagero	Maizuru ..													
Shiranuhi	Uraga													
3 others	—													
Yudachi	Sasebo	1935-1936	336	31.8	9.1	2	1368	37,000	34	5 5-in. 2 M.G.	8 21"	200	— 400	
Harusame	Maizuru ..													
Samidare	Uraga													
Umikaze	Maizuru ..													
Yamakaze	Uraga													
Kawakaze	Sasebo													
Suzukaze	Uraga													
Asashio	Maizuru ..													
Murasame	Sasebo													
Shigure	Uraga													
Shiratsuyu	Sasebo													
Hatsushima	Uraga	1933-1934	338	32.7	8.8	2	1368	37,000	34	5 5-in. guns	9	200	— 400	
Ariake	Kawasaki ..													
Yugure	Maizuru ..													
Wakaba	Sasebo													
Nenohi	Uraga													
Hatsuhara	Sasebo													
Oboro	Sasebo													
Akebono	Fujinagata..													
Sazanami	Maizuru ..													
Ushio	Uraga													
Akatsuki.. .. .	Sasebo	1929-1932	371.5	34	10.7	2	1700	40,000	34	6 5-in., 2 M.	9 21-in.	200	— 420	
Hibiki	Maizuru ..													
Ikazuchi	Uraga													
Inazuma	Fujinagata..													

Japan—continued.

Name or Number.	Where Built.	Launched.	Dimensions.			Number of Screws.	Displacement.	Horse-Power.	Maximum Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel
			Length (extreme).	Beam.	Draught.								Coal Oil
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
DESTROYERS—contd.													
FIRST CLASS—contd.													
Sagiri	Uraga	1929	371.5	34	10.7	2	1700	40,000	34	6 5-in., 2 M.	9 21-in.	197	— 420
Asagiri	Sasebo	1929											
Yugiri	Maizuru	1930											
Amagiri	Tokyo	1930											
Shiklami	Maizuru	1929											
Ayanami	Fujinagata	1929											
Fubuki	Maizuru	1927											
Shirayuki	Yokosuka	1928											
Hatsuyuki	Maizuru	1928											
Murakumo	Fujinagata	1928											
Shinonome	Sasebo	1928											
Usugumo	Ishikawa-	1927	320	30	9.8	2	1315	38,500	34	{ 4 4.7-in., 2 M. A.A. }	6 21-in.	148	— 400
Shirakumo	jima (Tokyo)	1927											
Isonami	Fujinagata	1927											
Uranami	Uraga	1927											
Minadzuki	Sasebo	1928											
Fumitsuki	Uraga	1926											
Nagatsuki	Fujinagata	1926											
Kikudzuki	Ishikawajima	1926											
Mikadzuki	Maizuru	1926											
Mochidzuki	Sasebo	1926											
Yudzuki	Uraga	1927											
Yayoi	Fujinagata	1927											
Udzuki	Uraga	1924, 25											
Mutsuki	Ishikawajima	1925											
Kisaragi	Sasebo	1924, 25											
Satsuki	Maizuru	1925											
Oite	Fujinagata	1925											
Hayate	Uraga	1924, 25											
Yunagi	Ishikawajima	1925											
Kamikaze	Sasebo	1924, 25											
Asakaze	Nagasaki	1922												320	30	9.6	2	1270	38,500	34	{ 4 4.7-in., 2 M. A.A. }	6 21-in.	148	— 400
Harukaze	Maldzura	1922-24											
Matsukaze	Fujinagata	1924											
Hatakaze	Nagasaki	1919-22											
Asanagi	Maldzura	1922-24											
Sawakaze	Mitsubishi,	1920-22											
Okikaze, Shimakaze,	Kawasaki,	1920-22											
Nadakaze, Yukaze,	Maldzura	1920-22											
Hakaze, Minekaze		1920-22											
Namikaze, Numakaze, Nokaze,		1920-22											
Tashikaze, Shlokaze,		1920-22											
Hokaze, Yakaze,		1920-22											
Akikaze		1920-22											
SECOND CLASS—													
Wakatake	Kawasaki,	1922	275	26.5	8.3	2	820	21,500	31.5	{ 3 4.7-in., 2 M. A.A. }	4 21-in.	110	— 250
Kuretake	Kobe	1922											
Fuyo	Fujinagata	1922, 23											
Karukaya	Ishikawa-	1922-23											
Asagao	jima	1922-23											
Yugao	Uraga	1923											
Sanaye	Sasebo	1923											
Yanagi, Momo	Maldzura	1916-18											
Hinoki	Yokosuka	1916-18											
Kaya	Kawasaki	1917-19											
Nashi, Kaki, Take	Kure	1917-19											
Kuri	Ishikawa-	1917-19											
Nire, Tsuga	jima	1917-19											
Hagi	Uraga	1920	275.5	26	8	2	770	21,500	31.5	{ 3 4.7 in. } { 2 M., A.A. }	4 21-in.	80	— 290
Susuki, Yomogi	Ishikawa-	1920											
Sumire	jima	1920											
Hishi, Hasu	Uraga	1922											
Tade, Fuji	Fujinagata	1922											
Aoi, Kiku	Kawasaki	1922											
Tsuta, Ashi,		1922											
TORPEDO BOATS—													
Chidori	Maizuru	1933	254	24	6	2	527	7000	26	3 4.7 in.	2 21-in.
Manazuru	Fujinagata	1933											
*Tomazuru	Maizuru	1933											
Hatsukari	Fujinagata	1933											
†Kawasemi	Kawasaki	1908	135	15½	7.2	1	96	1200	23	{ 1 1.85-in., 1 1.5-in.	3 14-in.	41	18 —

* Capsized in 1934 but has been repaired and put into commission again.

† ex-Chinese Hu Ngo.

Japan—continued.

Name or Number.	Where Built.	Launched.	Dimensions.			Number of Screws.	Displacement.	Horse-Power.	Maximum Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel.
			Length (extreme).	Beam.	Draught.								Coal Oil
Tons.													
TORPEDO BOATS—contd.													
Otari	Maizuru	1935	263	26	6½	2	595	9000	28	3 4·7-in. 1 M.G.	3 21 in.
Hyodori	Ishikawa-jima												
Hayabusa	Yokohama												
Kasasagi	Osaka												
Kari	Mitsubishi												
Sagi	Harima												
Hato	Ishikawa-jima												
Kiji	Mitsui Tama												
Further eight in No. building.													
SUBMARINES—													
I68	Kure	1933	331	27	13	2	Surf. Sub 1400	6000	20	1 4·7-in.	6 21-in.	60	..
I69	Kobe	1934											
I70	Sasebo												
I71	Kawasaki	1935											
I72 and I73	Mitsubishi												
I74 and I75	Sasebo	1936											
	Mitsubishi												
19-16	Bldg.	Abt. 2000						
I8	Kawasaki	1935	344	29·9	14·4	2	1950	6000	17	2 5·5-in.	4 21-in.	60	..
I7	Kure						2500	1800	9				
I6	Kawasaki	1934	320	30	15·7	2	1900	6000	17	1 5-in. seaplane	6 21-in.	60	..
I5	Kure						2500	1800	9				
I65	Kure	1931	321	26·9	15·9	2	1638	6000	19	1 4-in. 1 M.	6 21-in.	70	..
I66	Sasebo						2100	1800	9				
I67	Kobe	1929	320½	25·7	16	2	1635	6000	21	1 4·7-in.	6 21-in.	56	— 255
I61	Mitsubishi	1928					2100	1800	7·9				
I62	Kobe	1929					1955	6800	17				
I64	Kure	1929					2480	1800	9				
I4	Kawasaki	1926	320	30·2	15·7	2	1955	6800	17	{ 2 5·5-in. 1 M. }	6 21-in.	61	— 520
I1, I2, I3	Kawasaki	1927					2480	1800	9				
†I21	1928	279½	24·6	14	2	1142	2400	14	1 5·5-in.	4 21-in.	45	..
†I22	Kawasaki	1928					1470	1200	9·5				
†I23 .. .. .	.. .. .	1928										
†I24 .. .. .	.. .. .	1928										
I53	Kure	1927	331½	26	16	2	1635	6000	21	1 4·7-in.	8 21-in.	56	— 265
I55	Kure	1927					2100	1800	7·9				
I56	Kure	1929											
I54	Sasebo	1927											
I63	Sasebo	1928											
I60	Sasebo	1929											
I59	Yokosuka	1929											
I58	Yokosuka	1928											
I57	Kure	1929											
Ro. 33	Kure	1934					700	1200	16	1 3·15-in. A.A.	4 21-in.
Ro. 34	Mitsubishi	1935	239½	22	10·5	2							
Ro. 31	Mitsubishi	1927	243½	20	12·4	2	655	1200	13	1 3·15-in. A.A.	4 21-in.	43	— 75
Ro. 65	Mitsubishi	1926					1000	1200	10				
Ro. 66	Mitsubishi	1927	250	24·2	12·4	2	988	2400	16	1 3·15-in. A.A., 1 M.	6 21-in.	47	— 75
Ro. 67	Mitsubishi	1927					1300	1800	10				
Ro. 68	Mitsubishi	1925											
Ro. 64	Mitsubishi	1925											
Ro. 63, 62, 61	Mitsubishi	1924											
Ro. 60	Mitsubishi	1923											
I. 51 †	Kure	1924	300	28·7	15	2	1390	6000	19	1 4·7-in.	8 21-in.	60	— 190
I. 52 .. .. .	.. .. .	1925	330	25	16·8		2000	1800	7·9			
Ro. 32, 30	Kawasaki	1924	243·5	20	12·4	2	655	1200	13	1 4-in.	4 21-in.	43	— 75
Ro. 28	Kawasaki	1923					746	2600	16				
Ro. 27	Sasebo	1923					1000	1200	10				
Ro. 26	Yokosuka	1924					1000	1200	10				
Ro. 57	Sasabo	1922	250	23·5	13	2	889	2400	17	1 3·15-in. 1 3-pr.	4 21-in.	65	— 76
Ro. 58, 59	Kure	1923					1082	1200	10·5				
Ro. 56, 55	Yokosuka	1922											
54, 53	Mitsubishi	1922					893	2400	17				
51	Mitsubishi	1921	231·5	23·5	13	2	1082	1200	10·5	1 3·15-in. H.A., 1 3-pr.	6 18-in.	65	— 76

† Fitted for minelaying.

‡ Carries small seaplane.

Netherlands.

Name or Number.	Where built.	Launched.	Dimensions.			Number of Screws.	Displacement.	Horse-power.	Maximum speed.	Armament.	Torpedo Tubes.	Complement.	Fuel.	
			Length. (Extreme.)	Beam.	Draught.								Coal.	Oil.
DESTROYERS—														
*Banckert ..	Burgerhout	1929								4 4·7-in.,				
*Van Nes ..	Rotterdam	1930								1 3-in. A.A.,				
*Van Galen ..	Fijenoord	1928	321·5	31	9·8	2	1316	31,000	34	4 1-pr., 4 M.	6	126	—	300
*Witte de With	Rotterdam	1928								1 seaplane				
Van Ghent	Flushing	1926								24 mines				
*Evertsen ..	Rotterdam	1926								4 4·7-in.				
*Piet Hein ..		1927	321·5	31	9·8	2	1316	31,000	34	2 3-in. A.A.	6	126	—	300
*Kortenaer		1927								24 mines 1 seaplane				
1ST CLASS TORPEDO BOATS—														
G 13, 15 and 16 ..	{Scheldt Fijenoord }	{1913— 1914 }	{162·5	17·3	9·0	1	150	2,600	25	2 3-in.	3 17·7"	27	40	—
Z 3 ..	Amsterdam	{1916— 1917 }	{201	20·4	6	2	277	5,500	27	2 3-in., 2 M.	4 17·7"	48	61	70
Z 5-8 ..	{Scheldt Fijenoord }	{1915	192	19·8	5·5	2	264	5,500	27	2 3-in., 2 M.	4 17·7"	48	70	7
SUBMARINES—														
K XIV ..	Rotterdam	1932-3	242	21·5	12·5	2	770	3,200	17	1 3·5-in., 2 2-pr.	8 21"	35	..	..
K XV ..							1,030	1,000	9					
K XVI ..	Fijenoord	Bldg.	265	24·6	12·5	2	950	5,000	17	1 3·5-in., 2 1·5-in.	8 21"	36	..	..
K XVII ..							1,020	—	9					
K XVIII ..	Rotterdam	Bldg.	..	..	..	2	..	5,000	20	1 3·5-in., 2 1·5-in.	8 21"	..	..	..
K XIX ..							..	—	—
K XX ..	De Schelde	Bldg.	..	..	..	2	..	5,000	20	1 3·5-in., 2 1·5-in.	8 21"	..	..	..
K XXI ..							..	—	—
K XXII ..	Rotterdam	Bldg.	..	..	..	2	..	5,000	20	1 3·5-in., 2 1·5-in.	8 21"	..	..	..
K XXIII ..							..	—	—
K XXIV ..	Rotterdam	Bldg.	..	..	..	2	..	5,000	20	1 3·5-in., 2 1·5-in.	8 21"	..	..	..
K XXV ..							..	—	—
K XXVI ..	Rotterdam	Bldg.	..	..	..	2	1,200	5,000	20	1 3·5-in., 2 1·5-in.	8 21"	..	..	..
K XXVII ..							Wilton Fijenoord	Bldg.	..					
O 12 ..	De Schelde	1931	199	18·7	11·5	2	560	1,900	15	2 1·5-in. A.A.	5 21"	31	..	..
O 13 ..							700	600	8					
O 14 ..							878	3,200	18					
O 15 ..							1,190	860	9					
O 16 ..	De Schelde	1936	251	21·5	13	2	660	2,400	15	1 3·5-in. 2 1·5-in.	6 21"	35	..	—
†K XIII ..	Fijenoord	1924	218·8	20·2	12·2	2	810	725	8	1 3·5-in. 1 maxim	17·7"	31	—	45
†K XII ..							..	—	—
†K XI ..	Fijenoord	1925	179½	18·7	11½	2	506	900	12½	1 22-pr. A.A., 1 maxim	5 21"	29	—	21
O 11 ..							627	—	9					
O 10 ..	Amsterdam	1914	150·3	15·8	12·3	2	364	480	13	1 maxim	4 17·7"	26	—	18
O 9 ..	Flushing						434	320	8·5					
O 8 ..	..	1916	112	12·8	9·5	2	177	350	11·5	1 maxim	3 17·7"	12	—	5·4
(ex-British H6)							206	185	8·5					
O 7 ..	Fijenoord	1923						1,550						
†K X ..	De Schelde	1922	210	18·3	11·9	2	560	1,550	15	1 3·5-in. 1 maxim	4 17·7"	31	—	45
†K IX ..		1922					690	630	8					
†K VIII ..		1922					1,800	630	—					
†K VII ..	Fijenoord	1921	177·2	16·8	12·5	2	550	1,200	15	1 3-in., 1 maxim	6 17·7"	31	—	76

* Dutch East Indian Fleet.

† Indian Military Marine.

Name or Number.	Where Built.	Launched.	Dimensions.			Number of Screws.	Displacement.	Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel. Coal Oil
			Length. (Extreme)	Beam.	Draught.								
DESTROYERS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Draug, Troll, Garm 2 Destroyers building	Horten ..	1908-13	226	23·5	8·8	2	540	7,500 (Garm 8,000)	27·0	6 3-in. Draug has 6 4·7-in. in addition	3 18 -in.	71	95 6
TORPEDO BOATS:													
FIRST CLASS—													
Snogg, Stegg, Trygg	Horten ..	{1919- 1920}	173·9	18	5½	2	250	3,500	25	2 3-in.	18"	31	30
Storm, Brand ..	Horten ..	1900	130·9	16·0	6·9	1	100	1,100	21	2 m.	18"	19	17
Laks, Sild, Sæl, Skrei	Horten ..	1901	126·4	15·0	6·9	1	100	1,150	21·8	2 m.	18"	19	—
Sleipner, Aegir ..	Horten ..	1936	236·3	25·5	6·9	2	625	12,500	30	3 4-in., 1 1·5-in. A.A.	4 21"	72	100
Gyller													
2 others building ..													
SECOND CLASS—													
* {Kjek, Hvas, Kvik, Blink Lyn, Hauk, Falk	Fredrikstad Horten ..	1898 } 1903 }	114·5	14·5	6·0	1	73	650-750	19-20	2 m.		14	11
Skarv, Teist	Horten ..	1906-7	133	14·5	6·5	1	100	1,600	25	2 3-pr.	18"	18	16
Lom, Jo, Grib	Horten ..	1903	117	14·5	5·7	1	72	1,100	23	2 m.	18"	16	15
Ravn, Orn	Horten ..	1903	113	14·5	5·7	1	73	850	23	2 m.	18"	16	15
Kjell	Horten ..	1912	135	14·9	6·4	1	100	1,800	25	2 3-pr.	18"	19	15
SUBMARINES—													
A 2, 3, 4	Germania Kiel	1909 to 1913 }	133·2	15·7	8·9	2	246 332	900 380	14 7	—	3 18"	17	— 12·8
B 1, 2	Horten ..	1922					413	900	14·5	1 3-in.	4	23	—
B 3, 4	Horten ..	1923-24	167·3	17·5	10·5	2	545	640	10		18"	21	—
B 5, 6	Horten ..	1929											

* Employed as patrol ships.

Soviet Union.

Some of the details given below are uncertain.

Name or Number.	Where Built.	Launched.	Dimensions.			Number of Screws.	Displacement.	Horse-Power.	Designed Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel. Coal Oil
			Length. (Extreme)	Beam.	Draught.								
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
FLOTILLA LEADERS—													
Leningrad .. ..	..	1935											
Kharkov .. .. .	..	1936											
Minsk .. .. .	..	1936											
Tashkent .. .. .	..											
Perekop .. .. .	..											
Stalingrad .. ..	..											
Moscow .. .. .	..											
4 others .. .. .	..											
DESTROYERS—													
Felix Dzerzhinski	Ship & Eng. Co., Niko- laev	1917	303	29·5	10·5	2	1326	29,000	28	4 4-in., 2 7- pr., 4 m., can carry 80 mines	12 18" (T.)	120	— 390
Petrovski													
Nezamojni													
Shaumyan													
Karl Marx	Revel ..	1915	344·5	31·3	9·7	2	1350	32,700	35	5 4-in., 1 3- in. A.A., carries mines	9 18" (T.)	120	— 400
Kalinin													
Karl Liebknecht	Leningrad ..	1914	321	31	9·25	2	1610	32,000	29	4 4-in., 1 3-in. A.A., 2 m., 80 mines	9 18" (T.)	110	— 400
Uritsky													
Volodarski		1914											
A. Zhdanov		1915	315	31	10	2	1260	30,000	28			110	— 350
Engels													
Stalin													
Artem													
Volkov													
Lenin													
Frunze	Leningrad ..	1914	336	31·1	9·8	2	1100	23,000	34	4 4-in., 1 3- in., 4 m.	6 (D.)	120	— 350
Shtorm .. .. .	..	1932	236	24	10	2	700	13,200	29	2 4-ins., 3 3-in., 2 m. 40 mines.	9 18"	72	..
Shkval .. .. .	..											
Groza, Metali, Smertsch, Taifun, Uragan, Wiche, Winga, Zyklon, Grom, Vikur	..	1933-35	236	24	10	2	700	13,200	29	2 4-in., 3 3-in., 2 m. 40 mines	9 18"	72	..
GUARD SHIPS—													
Oberschinski ..	..	1934	250	27	..	3	800	5,400	20	2 4-in., 1 1·5-in.	..	..	..
Kirov													

Soviet Union—continued.

Name or Number.	Where Built.	Date of Completion.	Dimensions.			Number of Screws.	Displacement. Surf./Sub.	Horse-Power.	Designed Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel				
			Length. (Extreme.)	Beam.	Draught.								Coal Oil				
			Feet.	Feet.	Feet.	Tons.			Knots.				Tons.				
SUBMARINES—																	
Chartist	1930-	240	23	13½	1039	..	..	..	1 4-in., 1	6	..	..		
Garibaldiets	1933				1335	M.G.	21"		
Karbonari	1931				Bldg.	240	23	13½	..	869	2500	15	1 4-in., 1	8	44	78
Dekabrist																
Narodovoleets	1931	Bldg.	240	23	13½	..	869	2500	15	1 4-in., 1	8	44	78			
Krasnogvardeets	1318	1200	8	1 5 in., 1 M.	21"
L 1-3	1931	Bldg.	240	23	13½	..	869	2500	15	1 4-in., 1	8	44	78			
Komsomolka	1318	1200	8	1 5 in., 1 M.	21"
Jacobinets	1931	Bldg.	240	23	13½	..	869	2500	15	1 4-in., 1	8	44	78			
Revolusioner	1318	1200	8	1 5 in., 1 M.	21"
Spartakovets	1931	Bldg.	240	23	13½	..	869	2500	15	1 4-in., 1	8	44	78			
5 others	1318	1200	8	1 5 in., 1 M.	21"
35 in number Type M	Bldg.	..	..	..	200	..	..	..	1 1 5-in.	2	..	..		
30 in number Type Schtsch	1935-	..	..	..	500	..	..	..	1 1 5-in.	6	..	..		
10 in number	1937	..	..	..	800	..	..	..	..	..	..	..
Pravda	Bldg.	..	..	..	800	..	..	..	..	..	..	..
Iskra	1936	..	..	..	1200	..	..	..	2 4-in., 2 M.	8	..	..		
Zvezda	1800		
Bolshevik	1936	..	..	..	1200	..	..	..	2 4-in., 2 M.	8	..	..		
Komissar	1800		
Kommunar	1936	..	..	..	1200	..	..	..	2 4-in., 2 M.	8	..	..		
Tovarisuch	1800		
Krasnoarmeets	St. Petersburg	1916-	223	14½	12·6	..	650	2400	16	2 6-pr., 1	4	33	—				
Krasnoflotets	1917	..	..	..	..	790	900	9	M.G.	18"	..	40	
Bednyak	1918-	150	15½	15½	..	375	480	13	1 6-pr., 1	4	28	—				
Proletarii						1922	467	320	11	M.G.	18"	..	17
Marxist	1918-	150	15½	15½	..	375	480	13	1 6-pr., 1	4	28	—				
Politrabotrik						1922	467	320	11	M.G.	18"	..	17
L55 (ex-British)	1917	230	24	13	2	870	2400	17	1 4-in., 1	6	40	—				
	1139	1600	10	M.G.	21"	..	78				

There are about thirty-five destroyers and torpedo-boats completed from 1895 to 1912 of very little if any fighting value. Many of the above vessels are known to be practically useless until very extensively repaired and refitted.

Spain.

Name or Number.	Where Built.	Launched.	Dimensions.			Number of Screws.	Displacement.	Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel Coal Oil
			Length. (extreme.)	Beam.	Draught.								
FLOTILLA LEADERS—													
Gravina	Cartagena ..	1934	333	31·7	10·5	2	1,536	42,000	36	{ 5 4·7-in. 13-in. A.A. 4 M. }	6 21-in. (T.)	175	— 540
Escano													
Ciscar													
Jorge Juan													
Ulloa													
Almirante Valdés..													
" Antequera ..													
" Miranda ..													
Churrucá													
Alcala Galiano ..													
Lepanto													
José Luis Díez ..													
Sanchez-Barcaiztegui													
Alava	Bldg.												
Linears	Bldg.												
DESTROYERS—													
Alsado	Cartagena ..	{ 1922	283	27	9	2	1,145	33,000	34	{ 3 4-in., 2 2-pr. A.A. }	4 21-in. (D.)	70	— 265
Velasco		{ 1923											
Juan Lazaga		{ 1924											
TORPEDO BOATS—													
11 boats	Cartagena ..	{ 1913- 1922	{ 164	16·5	6½	3	187	3,750	26	3 3-pr.	3 18-in.	31	33 —
SUBMARINES—													
D1	Cartagena ..	{ 1934	276	21·8	13	2	1050	5000	20·5	1 4·7-in.,	6
D2 & D3		{ 1935					1375	1350	9·5	4 M.	21-in.		
C 2-6	Cartagena ..	{ 1928	247	20·8	13·5	2	900	2000	16	1 3-in. A.A.	6	40	..
Isaac Peral (ex-C 1)		{ 1929					1270	750	8·5		21-in.		
B 1-6	Cartagena ..	1921-24	210	18·9	11·25	2	560 830	1400 850	16 10·5	1 3-in. A.A.	4 18-in.	28	— 66

Sweden.

Name or Number.	Where Built.	Launched.	Dimensions.			Number of Screws.	Displacement.	Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel.
			Length (Extreme.)	Beam.	Draught.								
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
DESTROYERS—													
Goteborg	Gothenburg	1935											
Stockholm	Karlskrona	1936	304	29·6	12½	2	1030	32,000	39	{ 3 4·7-in., 4 1-in.	6 21"	120	— 150
Klas Horn	Malmö	1931	304·2	29·2	10·5	2	1000	24,000— 26,000	35	{ 3 4·7-in., 2 2-prs. trpl A.A., 2 M.	2 21"	125	— 150
Klas Uggle	Karlskrona												
Ehrensköld	Göteborg	1926											
Nordenskjöld	Malmö												
Wale	Malmö	1906	216	20·8	9	2	354	8,000	30	2 3-in., 4 6-prs.	4 18"	69	80 —
Ragnar†	Malmö	1909											
Sigurd	Gothenburg	1908											
Vidar	Malmö	1909	216	20·8	9	2	354	{ 8,000— 9,000 }	30·0	{ 4 3-in., 2 M.	4 18" (D.)	67	80 3
Hugin	Gothenburg	1909											
Munin	Malmö	1910											
Wrangel†	Gothenburg	1917	232·8	22	9·2	2	458	11,000	34·0	4 3-in., 2 M.	6 18"	72	107 6
Wachtmeister	Gothenburg	Bldg.	304	29½	12½	..	1630	32,000	39	3 4·7 in.	6 21"	..	..
Malmö	Karlskrona												
Karlskrona	Karlskrona												
TORPEDO-BOATS—													
1st Class—													
Castor†, Pollux† ..	{ Normand & Karlskrona }	1908											
Vega†	Karlskrona ..	1910											
Vesta†	(Bergsund and Gothenburg)	1909	128	14·5	8·5	1	103	2,000	25	2 6-prs. (except Castor and Pollux which have 2 1-prs.)	2 18" (†)	18	20 —
Spica, Astrea, Iris, Thetis	Stockholm ..	1908											
Altair†													
Antares†													
Argo†													
Arcturus†													
Perseus, Polaris ..	Bergsund ..	1910											
Regulus, Rigel ..	Stockholm ..	1915											
2nd Class—													
5, 6, 7, 8, 9	Thornycroft	1906— 1908	106	12½	6½	1	50	750	20	1 1·5-in.	2 18"	14	22 —
SUBMARINES—													
1st Class—													
Ulven	Naval Yard,	1930					700	2800	16		4		—
Draken	Karlskrona	1926	217	21	10·8	..	850	—	9	1 4-in., 1 M.	20-in.	32	40
Gripen		1928											
Bavarn	Naval Yard,	1921	187	18·5	9·2	..	500	2800	15	1 3-in., 1 M.	4 18"	..	33
Illern	Karlskrona						650	—	9				
Uttern													
Sälen	Kockum Co.,	1920	177·2	16·2	11·2	..	450	..	..	1 3-in., 1 M.	4 18"	..	23
Valrossen	Malmö ..						580						
Hajen													
Mine-laying Sub.—													
Valen	Karlskrona	1925	186	23·2	9·4	..	492	..	15 9	1 3-in., 1 M.	4 18"	..	34
Nordkaparen							650						
Definen	Kockum ..	1935	199	20½	11	..	500	..	15	1 4-in.	4 21"	28	..
Springaren							720		10				
Sjölejonet		1936	204	20½	11	2	620	..	15	1 4·1-in., 2	4 21"	32	..
Sjöbjörnen							—		10	M.G.			
Sjöhundén	Kockum ..	Bldg.											

† Fitted for mine-laying.

* Also two motor torpedo-boats, Nos. 3 and 4, 11 tons, 41 knots, 1 M.G. 2 18" torpedo tubes.

‡ Torpedo-boats marked ‡ have one 18-inch tube only.

United States.

Name or Number.	Where built.	Completed.	Dimensions.			Number of Screws.	Standard Displacement.	Horse-Power.	Maximum Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel Oil.
			Length. (Extreme.)	Beam.	Draught.								
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
DESTROYERS—													
Davis	Bath, I.W. Co.	Bldg. 1935	381	36½	10½	2	1850	52,000	37	8 5-in., 8 M.G.	12 21-in.	195	500
Sampson		Bldg.											
Jouett	Federal S.B. & D.D. Co.												
Somers													
Warrington ..													
Porter	N.Y.S. Co., Camden	1936											
Selfridge ..		1937											
McDougal ..		1936											
Winslow ..		1936											
Phelps	Bethlehem S.B. Co., Quincy	1937											
Clark			381	36½	10½	2	1850	50,000	37	8 5-in. guns 8 M.G.	8 21-in.	175	500
Moffett													
Balch													
Charles F. Hughes	Charleston												
Hilary P. Jones	Puget Sound												
Lansdale ..	Boston, N.Y.	Bldg.											
Madison ..	Bath, I.W. Co.												
Niblack ..	Maine												
Gleaves ..	Bethlehem S. Co. Quincy												
Mayo													
Benson ..	Philadelpia, N.Y.												
Buck	Norfolk, N.Y.												
Wainwright	Charleston												
Roe	N.Y.												
Morris	Norfolk N.Y.												
Walke	Boston N.Y.												
O'Brien ..	Newport												
Russell ..	News												
Mustin ..	Federal S.B. & D.D. Co.												
Hammann ..	Bath, I.W. Co.												
Anderson ..													
Hughes ..	Puget Sound												
Sims	Charterton N.Y.	Bldg.											
Wilson ..	Norfolk N.Y.												
Sterrett ..	Philadelphia N.Y.												
Stack													
Rowan	Boston N.Y.												
Rhind	Bethlehem S.B. Co.												
Trippe													
Mayrant ..													
Maury													
McCall													
Lang	Federal S.B. & D.D. Co.												
Ellet													
Benham ..													
†Jarvis ..	Navy Yard, Puget Sound		334 on W.L.	34½	9½	2	1500	42,800	36½	5 5-in. guns 8 M.G.	8 21-in.	190	..
†Patterson ..													
†Henley ..	Navy Yard, Mare Is.												
†Ralph Talbot													
†Mugford ..	Navy Yard, Boston												
†Helm													
†Blue	Navy Yard, Norfolk												
†Bagley ..													
Fanning ..	United D.D. Co.												
Dunlop ..													
†Craven ..	Bethlehem S.B. Co.												
†Gridley ..													
Mahan ..	United D.D. Inc., N.Y.												
Cummings ..	Bath I.W. Co.												
Drayton ..													
Lamson ..	Federal S.B. & D.D. Co.												
Flusser ..													
Reid													
Case													
Conyngham	Navy Yard, Boston	1936-1937											
Cassin ..													
Shaw	Navy Yard, Philadelphia												
Tucker ..													
Downes ..	Norfolk												
Cushing ..	Navy Yard, Puget Sound												
Perkins ..													
Smith	Navy Yard, Mare Is.												
Preston ..													
Dale	Navy Yard, N.Y.												
Monaghan ..	Navy Yard, Boston	1935											
Aylwin ..	Navy Yard, Philadelphia												

† Fitted with 4 5-inch guns.

United States—continued.

Name or Number.	Where built.	Completed.	Dimensions.			Number of Screws.	Standard Displacement.	Horse-Power.	Maximum Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel. Oil.	
			Length. (Extreme.)	Beam.	Draught.									
DESTROYERS— continued.			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.	
Farragut .. {	Bethlehem S.B. Co.	1934	334	34½	9½	2	1,365	42,800	36½	5 5-in. A.A. 8 M.G.	8 triple (Q)	160	400	
Dewey {	Bath, I. W. Co.						1,345							
Hull {	Navy Yard, N.Y.						1,395							
MacDonough .. {	Navy Yard, Boston	1,395												
Worden {	Navy Yard Puget Sound	1,410												
Pruitt {	Bath, I.W.	1920					25,000							
Sicard {		1920												
Preble {														
William B. Preston .. {	Norfolk, N.W.	1920					26,000							
Noa {		1921												
Hulbert {		1920												
Decatur {	1922													
Perry {	Navy Yard, Mare Is.	1922												
Trever {		1922												
Wasmuth {		1921												
Zane {	1921													
Litchfield .. {	1920													
Meade {	Bethlehem S.B. Co., Squantum	1919	314.4	31	9.8	2		1,190	35	4 4-in., 1 3-in. A.A.	4 triple 21-in.	122	375	
Swasey {														
Thornton {														
Bailey {														
Shubrick {														
Ballard {														
Greene {														
Edwards {														
McLanahan .. {														
Laub {														
Gillis {	Bethlehem S.B. Co., Quincy	1919	314.4	31	9.8	2	1,190	35	(Kane, Fox, Brooks, and Hatfield have 4 5-in. guns.)	4 triple 21-in.	122	375		
Aulick {														
Welles {														
Bancroft {														
Osmond Ingram .. {														
Rodgers {														
McCalla {														
McCook {														
Belknap {														
Lawrence {														
Hopkins {														
Barry {														
Goff {														
Bainbridge .. {														
Reuben James .. {														
Williamson .. {														
Sands {	New York S.B. Co.	1920	314.4	31	9.8	2	1,190	26,000	35	4 4-in., 1 3-in. A.A. (Parrot, Whipple, Edws. Borie & Tracy have 4 5-in. guns.)	4 triple 21-in.	122	375	
King {														
Childs {														
Sturtevant {														
Overton {														
McFarland {														
Humphreys {														
Kane {														
Fox {														
Gilmer {														
Brooks {														
Hatfield {														
Paul Jones .. {	Cramp, Pa.	1921	314.4	31	9.8	2	1,190	26,000	35	4 4-in., 1 3-in. A.A. (Parrot, Whipple, Edws. Borie & Tracy have 4 5-in. guns.)	4 triple 21-in.	122	375	
Truxton {														
John D. Ford .. {														
Pillsbury {	Cramp, Pa.	1920	314.4	31	9.8	2	1,190	26,000	35	4 4-in., 1 3-in. A.A. (Parrot, Whipple, Edws. Borie & Tracy have 4 5-in. guns.)	4 triple 21-in.	122	375	
Peary {														
Pope {														
Stewart {														
McCormick .. {														
Bulmer {														
Simpson {														
MacLeish {														
Edsall {														
Parrott {														
Whipple {														
J. D. Edwards .. {														
Rorie {														
Tracy {														

United States—*continued.*

Name or Number.	Where built.	Completed.	Dimensions.			Number of Screws.	Displacement.	Horse-Power.	Maximum Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel.
			Length. (Extreme.)	Beam.	Draught.								
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
DESTROYERS—<i>continued.</i>													
Barker ..	Newport News S.B. Co.	1919	314·4	31	9·8	2	1,190	27,000	35	4 4-in., 1 3-in. A.A. (Long and Hovey have 8 4-in. in twin mtgs. and 1 3-in. A.A.)	4 triple 21 in.	122	375
Alden ..													
Broome ..													
Long ..													
Hovey ..													
Southard ..													
Chandler ..													
Dallas ..	Newport News S.B. Co.	1920	314·4	31	9·8	2	1,190	25,000	35	4 4-in., 1 3-in. A.A.	4 triple 21-in.	122	375
Herndon ..													
Branch ..													
George E. Badger ..													
Welborn C. Wood ..													
Hunt ..	Newport News S.B. Co.	1920	314·4	31	9·8	2	1,190	25,000	35	4 4-in., 1 3-in. A.A.	4 triple 21-in.	122	375
Abel P. Upshur ..													
Mason ..													
Satterlee ..													
Goldsbrough ..													
Dahlgren ..													
Clemson ..													
DD 185 (<i>ex</i> Bagley) ..	Union I.W.	1919	314·4	31	9·8	2	1,060	25,000	35	4 4-in., 1 3-in. A.A.	4 triple 21-in.	122	286
Abbot ..													
Haraden ..													
Thomas ..													
Hopewell ..													
Stansbury ..	Union I.W.	1920	314·4	31	9·8	2	1,060	27,000	35	4 4-in., 1 3-in. A.A.	4 triple 21-in.	122	283
Howard ..													
Hogan ..													
Mackenzie ..													
Kalk ..													
Foote ..	Fore River S.B. Co.	1918	314·4	31	9·8	2	1,090	26,000	35	4 4-in., 1 3-in. A.A.	4 triple 21-in.	122	286
Maddox ..													
Cowell ..													
Crosby ..													
Walker ..													
Thatcher ..	N.Y. S.B. Co.	1918	314·4	31	9·8	2	1,090	26,000	35	4 4-in., 1 3-in. A.A.	4 triple 21-in.	122	286
Palmer ..													
Herbert ..													
Schenck ..													
Leary ..													
Dickerson ..	Cramp, Phil.	1919	314·4	31	9·8	2	1,090	26,000	35	4 4-in., 1 3-in. A.A.	4 triple 21-in.	122	286
J. Fred Talbot ..													
Cole ..													
Ellis ..													
Bernadou ..													
Dupont ..	Mare Island, N.Y.	1919	314·4	31	9·5	2	1,090	24,200	35	4 4-in., 1 3-in. A.A.	4 triple 21-in.	122	286
Biddle ..													
Blakeley ..													
Barney ..													
Breckenridge ..													
Roper ..	Bath I.W.	1918	314·4	31	9·5	2	1,090	26,000	35	4 4-in., 1 3-in. A.A.	4 triple 21-in.	122	286
Elliot ..													
Greer ..													
Upshur ..													
Yarnall ..													
Tarbell ..	New York S.B. Co.	1919	314·4	31	9·8	2	1,090	26,000	35	4 4-in., 1 3-in. A.A.	4 triple 21-in.	122	286
Hamilton ..													
Claxton ..													
Ward ..													
Kennison ..													
† Kilty ..													
† Boggs ..													
Tillman ..													
Crowninshield ..													
Hale ..													
Aaron Ward ..													
Buchanan ..													
Jacob Jones ..													
Babbitt ..													
Twiggs ..													
Badger ..													
Tattnall ..													

† Equipped as targets, wireless controlled.

United States—*continued.*

Name or Number.	Where built.	Completed.	Dimensions.			Number of Screws.	Displacement.	Horse-Power.	Maximum Speed.	Armament.	Torpedo Tubes.	Complement.	Fuel.
			Length. (extreme).	Beam.	Draught.								Oil.
			Feet.	Feet.	Feet.			Tons.	Knots.				Tons.
DESTROYERS—<i>continued.</i>													
† Lambertson ..	Newport News S. Co.	1919	314.4	31	9.8	..	{1060 1090}	25,000	35	4 4-in., 1 3-in. A.A.	4 triple 21-in.	122	286
Lea ..		1918											
Dorsey ..													
Dent ..													
Waters ..	Cramp, Pa.		314.4	31	9.8	..	1,090	26,000	35	4 4-in., 1 3-in. A.A. (Rathburne has 3 4-in.)	4 triple 21-in.	122	286
Talbot ..													
Rathburne ..													
Crane ..		1919											
Williams ..	Union Plant.	1919	314.4	31	9.8	..	1,060	27,000	35	4 4-in., 1 3-in. A.A.	4 triple 21-in.	122	283
Chew ..		1918											
Schley ..													
Taylor ..	Mare Island, N.Y.	1918	314.4	31	9.8	..	1,090	{27,000 24,200}	35	4 4-in., 1 3 in. A.A.	4 triple 21-in.	122	286
Fairfax ..													
McKean ..													
Ringgold ..	Union I.W.	1918	314.4	31	9.9	..	1,060	27,000	35	4 4-in., 1 3-in. A.A.	4 triple 21-in.	122	286
Robinson ..													
Colhoun ..													
Stringham ..													
Gregory ..	Fore River S.B. Co.	1918	314.4	31	9.8	..	1,060	27,000	35	4 4-in., 1 3-in. A.A.	4 triple 21-in.	122	283
Sigourney ..													
Little ..													
Evans ..													
Phillip ..	Bath I.W.		314.4	31	9.7	..	1,090	{27,000 27,000 24,200}	35	{4 4-in., 1 3-in. A.A. 3 4-in., 1 3-in. A.A. 5 4-in., 1 3-in. A.A.	4 triple	122	286
Wickes ..		1917											
Manley ..		1917											
Stockton ..	Cramp Pa.	1918						20,000	32	{4 4-in., 1 3-in. A.A. 4 4-in., 1 3-in. A.A.	4 triple 21-in.	122	260
Conner ..			315.5	30.7	9.5	..	1020	18,500	30	{4 4-in., 1 3-in. A.A.	4 triple 21-in.	122	260
No. 70, ex-Craven	Norfolk, N.Y.	1918						18,750	30	{4 4-in., 1 3-in. A.A. 4 4-in., 1 3-in. A.A.	4 triple 21-in.	122	260
								20,000	32	{4 4-in., 1 3-in. A.A.	4 triple 21-in.	122	290
Allen ..	Bath I.W.	1917	315.3	29.9	9.8	..	920	17,500	30	{4 4-in., 1 3-in. A.A.	4 triple 21-in.	122	290

† Equipped as targets, wireless controlled.

United States—continued.

Name or Number.	Where built.	Completed.	Dimensions.			Number of Screws.	Displacement. Surface.	Submerged.	Horse-Power.	Maximum Speed. Surface.	Submerged.	Armament.	Torpedo Tubes.	Complement.	Fuel. Oil.
			Length. (extreme.)	Beam.	Draught.										
			Feet.	Feet.	Feet.		Tons.			Knots					Tons.
DESTROYERS NOW FITTED AS MINELAYERS —															
Preble	Bath Ironworks	1920	314.4	30.5	9	2	1,160	27,000	35	4 4-in. 1 3-in. A.A. 92 mines	—	107	375		
Proitt															
Sicard															
Tracy	Cramp														
Ramsay	Newport News S. Co.	1918	314.4	30.5	9	2	1,160	25,000	35	4 4-in. 1 3-in. A.A. 92 mines	—	120	286		
Gamble															
Breese															
Montgomery ..		1919													
SUBMARINES —															
Perch	Electric Boat Co.	1936	300½	25	13.8	2	1,330	1,998	..	..	13-in.	6 21"	57	..	..
Pickrel															
Permit															
Plunger	Portsmouth Navy Yard														
Pollack	Mare Island Navy Yard	1937													
Pompano															
Tambor	Electric Boat Co.	Bldg.	298	26	14½	..	1,450	..	17 8	13-in.	8 21"	55	..		
Tautog															
Thresher															
Triton	Portsmouth Navy Yard														
Trout	Mare Island														
Tuna	Electric Boat Co.	Bldg.	298	26	14½	..	1,450	..	17 8	13-in.	6 21"	55	..		
Salmon															
Seal															
Skipjack	Portsmouth Navy Yard	1938	298	26	14½	..	1,450	..	17 8	13-in.	8 21"	55	..		
Snapper	Mare Island Navy Yard														
Stringray															
Sturgeon															
Sargo	Electric Boat Co.	Bldg.	298	26	14½	..	1,450	..	17 8	13-in.	6 21"	55	..		
Saury															
Spearfish															
Sculpin	Portsmouth Navy Yard														
Squalus	Mare Island N.Y.														
Swordfish	Electrical Boat Co.	Bldg.	298	26	14½	..	1,450	..	17 8	13-in.	6 21"	55	..		
Sea Dragon															
Sea Lion															
Sea Raven	Portsmouth Navy Yard														
Seawolf	Portsmouth Navy Yard.	1936	283	24.9	13	2	1310 1934	3,000	14	13-in.	6 21"	50	..		
Porpoise															
Pike															
Shark	Electric Boat Co.	1936	298	25.1	13.9	2	1315	..	..	13-in.	6 21"	56	..		
Tarpon	Portsmouth Navy Yard.	1932	319	27.8	13	2	1,540 2,215	4,250 875	17 8	14-in.	6 21"	58	..		
Dolphin															
Cachalot	Portsmouth Navy Yard	1934	271½	24.8	13	2	1,110 1,650	3,100 800	17 8	13-in. A.A.	6 21"	45	..		
Cuttlefish	Electric Boat Co.														
Argonaut	Portsmouth Navy Yard.														
Narwhal	Portsmouth Navy Yard.	1928	381	33.8	15.4	2	2,710 4,080	3,175 1,200	14.6 8	2 6-in., 60 mines	4 21"	86	185		
Nautilus	Mare Island Navy Yard.														
Bonita	Portsmouth Navy Yard.	1926 1925 1924	341.5	27	14.6	2	2,000 2,506 1,000	6,700 1,200 2,000	19 8	13-in. A.A.	6 21"	87	160		
Bass															
Barracuda															
S48	Lake T.B. Co., Bridgeport	1922	267	21.8	13.5	2	1,458	1,500	11.0	14-in.	5 21"	38	237		
S47*	Bethlehem Shipbuilding Corp., Quincy Plant	1925	225.3	20.5	16	2	850 1,126	1,200 1,500	14 10.4	14-in.	4 21"	44	154		
S46*		1925													
S45*		1925													
S44*	Bethlehem Shipbuilding Corp., Union Plant	1925	219.3	20.5	16	2	800 1,062	1,200 1,500	14.5 11	14-in.	4 21"	42	140		
S43*		1924													
S42*		1924													
S41*	Bethlehem Shipbuilding Corp., Union Plant	1924	219.3	20.5	16	2	800 1,062	1,200 1,500	14.5 11	14-in.	4 21"	42	140		
S40*		1923													
S39*		1923													
S38*		1923													
S37*		1923													
S36*		1923													

* Designed by Electric Boat Co., Groton, Conn.

United States—continued.

Name or Number.	Where built.	Completed.	Dimensions.			Number of Screws.	Displacement. Surface.	Displacement. Submerged.	Horse-Power.	Maximum Speed. Surface. Submerged.	Armament.	Torpedo Tubes.	Complement.	Fuel Capacity.		
			Length. (Extreme.)	Beam.	Draught.											
			Feet.	Feet.	Feet.		Tons.			Knots				Tons.		
SUBMARINES—continued.																
S35*	Bethlehem Shipbuilding Corp., Union Plant	1923	219·3	20·5	16	2	800 1,062	1,200 1,500	14·5 11	1 4-in.	4 21"	42	140			
S34*		1923														
S33*		1923														
S32*		1923														
S31*		1923														
S30*		1920														
S29*		1924														
S28*		1923														
S27*		1924														
S26*		1923														
S25*		1923														
S24*	Bethlehem Shipbuilding Corp., Quincy Plant	1923	219·3	20·5	16	2	800 1,062	1,200 1,500	14·5 11	1 4-in.	4 21"	42	140			
S23*		1923														
S22*		1924														
S21*		1923														
S20*		1922														
S18*		1923														
S17*		1921														
S16*	Lake T.B. Co., Bridgeport	1920	231	21·5	13	2	790 1,092	2,000 1,200	15·25 9	1 4-in.	4 21"	38	123			
S15*		1921														
S14*		1921														
S13*	Navy Yard, Portsmouth	1923	231	21·8	13	2	790 1,092	2,000 1,200	14·75 9	1 4-in.	5 21"	38	123			
S12*		1923														
S11*		1923														
S1*	Fore River S.B. Co.	1920	219·3	20·7	16	2	800 1,062	1 200 1,500	14·5 11	1 4-in., 1 aeroplane	4 21"	38	140			
R20*	Union I.W.	1918	186 1	17·5	14·5	2	530 680	880 934	13·5 10·5	1 3-in.	4 21"	30	63			
R19*																
R18*																
R17*																
R16*																
R15*																
R14*																
R13*																
R12*																
R11*																
R10*																
R9*	Fore River S.B. Co.	1919	172·3	17·5	14·4	2	480 624	880 740	14 10·5	1 3-in.	4 21"	30	73			
R7*																
R6*																
R5*																
R4*																
R3*																
R2*																
R1*																
O10*	Fore River S.B. Co.	1918				172·3	17·5	14·4	2	480 624	880 740	14 10·5	1 3-in.	4 21"	30	73
O9*																
O8*																
O7*																
O6*																
O4*																
O3*																
O2*																

* Designed by Electric Boat Co., Groton, Conn.

§ To be disposed of shortly.

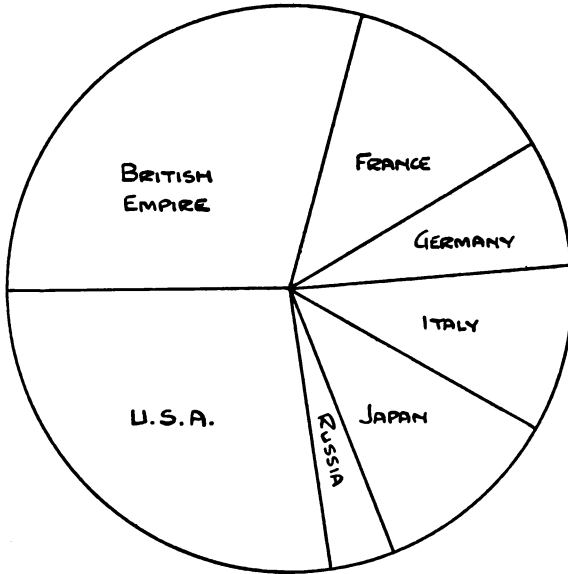
The machinery contractors for the vessels of the E. B. Co. Design built in yards other than the Navy Yards were the New London Ship and Eng. Co., Groton, Conn., and the hulls were built under sub-contract from the E. B. Co.

TABLES OF COMPARATIVE NAVAL STRENGTH

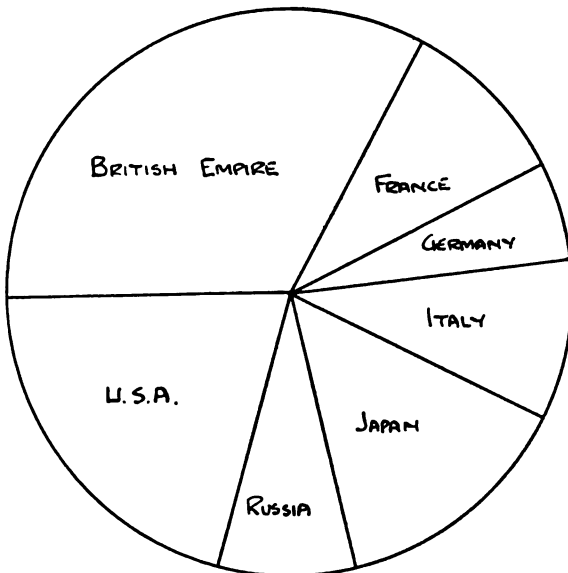
I

COMPARATIVE NAVAL STRENGTHS

DIAGRAMS OF TOTAL TONNAGE ~ BUILT AND BUILDING

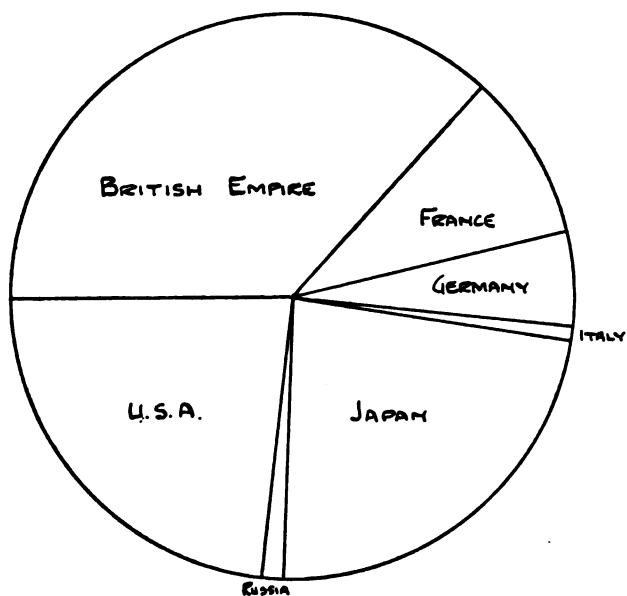


BATTLESHIPS AND BATTLECRUISERS

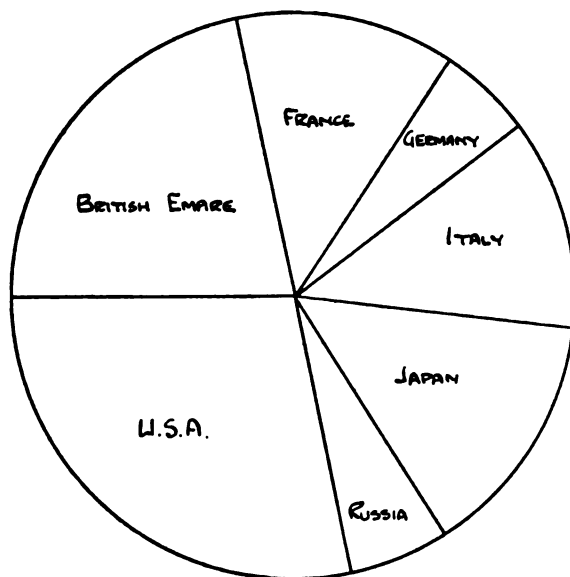


CRUISERS

II COMPARATIVE NAVAL STRENGTHS



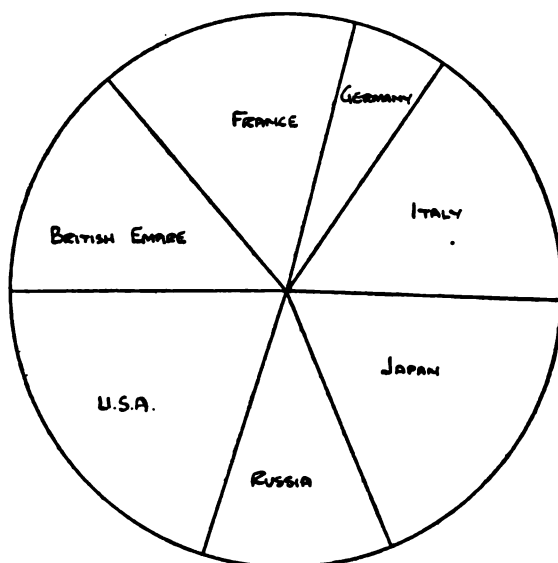
AIRCRAFT CARRIERS



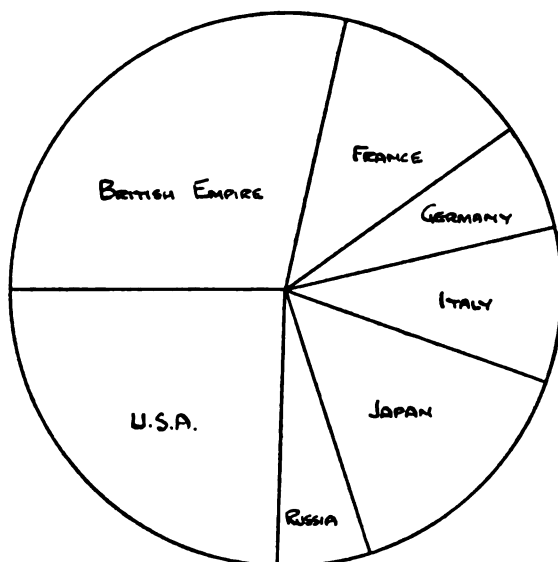
FLOTILLA LEADERS, DESTROYERS AND TORPEDO BOATS

III

COMPARATIVE NAVAL STRENGTHS



SUBMARINES



TOTAL TONNAGE - BATTLESHIPS, BATTLECRUISERS
CRUISERS, AIRCRAFT CARRIERS, FLOTILLA LEADERS
DESTROYERS & TORPEDO BOATS - BUILT & BUILDING.

TABLE I.—EFFECTIVE FIGHTING SHIPS, BUILT, BUILDING, AND PROJECTED.

Class.	British Empire.		U.S.A.		Japan.		France.		Italy.		Soviet Union.		Germany.	
	Built.	Building.	Projected.	Built.	Building.	Projected.	Built.	Building.	Projected.	Building.	Projected.	Built.	Building.	Projected.
Battleships { 14-in. guns and upwards .	12	7	—	14	6	—	—	—	—	—	(h)	—	—	—
Battleships { Below 14-in. guns . . .	—	—	—	1	—	—	5	—	4	—	4	—	2	—
Battle-cruisers	3	—	—	—	—	—	2	—	—	—	—	—	—	—
Cruisers	52(o)	21	—	29	12	—	18	3	—	12	16	6	7	2
Cruiser Minelayers	1	—	—	2	—	—	2	—	—	—	1	—	—	—
Minelayers	7	5	—	10	—	—	2	—	—	—	8	—	—	—
Armoured Coast Defence Vessels, Monitors, and Netlayers	5(a)	—	—	—	—	—	1	—	5	—	2	—	—	—
Aircraft Carriers	9(b)	5	—	7(m)	2	—	2(g)	2	1(l)	—	1	—	2	—
Flotilla Leaders and Destroyers	163	36	—	203	45	—	59	13	111	22	31	5	6	—
Torpedo Boats	—	—	—	13	8	—	13	—	3	—	—	—	2	12
Submarines	51	18	—	62	20	—	75	12	101	9	57	53	48	28
Sloops	51	10	—	11	—	—	9	2	1	—	—	—	10	—
Motor Torpedo Boats	12	15	—	—	—	—	8	2	58	—	150	—	14	6
Gunboats and Despatch Vessels	—	—	—	10	—	—	24	—	18	—	80	—	20	4
River Gunboats	19	4	—	6	—	—	10	1	2	—	4	—	—	—
Minesweepers	38	4	—	32(d)	2	—	12	18	42	1	38	—	26	—

NOTES:—

- (a) Includes 2 anti-aircraft ships.
 (b) Including 2 seaplane carriers one of which is not regarded as part of the War Fleet.
 (c) Includes 6 fitted as submarine rescue vessels.

- (e) There are also 7 old cruisers classed as Coast Defence or Special Service Vessels.
 (f) Includes 4 seaplane carriers.
 (g) Includes 1 aviation transport.
 (h) Blank space indicate that no details are available.

- (k) Includes 2 seaplane carriers.
 (l) Seaplane carrier "Miraglia."
 (m) Includes one aircraft tender.
 (n) Includes Schleswig-Holstein and Schlesien (1908) employed as training ships.
 (o) Includes 2 monitors used as training ships.

The ships under construction in Japan are not known.

TABLE II.—BATTLESHIPS WITH 14-IN. GUNS AND UPWARDS.

BRITISH EMPIRE.			UNITED STATES.			JAPAN.			FRANCE.			ITALY.			SOVIET UNION.			GERMANY.		
Completed.	Name.	Standard Displacement.	Completed.	Name.	Standard Displacement.	Completed.	Name.	Standard Displacement.	Completed.	Name.	Standard Displacement.	Completed.	Name.	Standard Displacement.	Completed.	Name.	Standard Displacement.	Completed.	Name.	Standard Displacement.
1927	Nelson	33,950 tons.	1923	Colorado	32,500 tons.	1921	Mutsu	32,720 tons.		Building.			Building.			Building.			2 Battle-ships	35,000
1927	Rodney	33,900	1923	West Virginia	31,800	1920	Nagato	31,800		Richelieu	35,000		Vittorio	35,000		2 Battle-ships	35,000		2 Battle-ships	35,000
1916	Malaya	31,100	1920	Tennessee	32,300	1917	Hyuga	29,990		Jean Bart	35,000		Teneto	35,000		2 Battle-ships	35,000		2 Battle-ships	35,000
1915	Valiant	31,100	1920	California	32,600	1917	Ise	29,330		(Tennecoau)	35,000		Littorio	35,000		2 Battle-ships	35,000		2 Battle-ships	35,000
1915	Barham	31,100	1921	Idaho	33,400	1915	Yamashiro	29,330		Gascogne	35,000		Roma	35,000		2 Battle-ships	35,000		2 Battle-ships	35,000
1915	Queen Elizabeth	30,600	1919	Idaho	33,400	1915	Fuso	29,330		Impero	35,000		Impero	35,000		2 Battle-ships	35,000		2 Battle-ships	35,000
1915	Warspite	30,600	1918	New Mexico	33,400	1915	Kirishima	29,330								2 Battle-ships	35,000		2 Battle-ships	35,000
1915	Royal Sovereign	29,150	1917	Mississippi	33,400	1915	Haruna	29,330								2 Battle-ships	35,000		2 Battle-ships	35,000
1916	Royal Oak	29,150	1916	Arizona	32,600	1913	Kongo	29,330								2 Battle-ships	35,000		2 Battle-ships	35,000
1916	Revenge	29,150	1916	Pennsylvania	29,000											2 Battle-ships	35,000		2 Battle-ships	35,000
1916	Resolution	29,150	1916	Oklahoma	29,000											2 Battle-ships	35,000		2 Battle-ships	35,000
1917	Ramillies	29,150	1916	Nevada	29,000											2 Battle-ships	35,000		2 Battle-ships	35,000
			1914	Texas	27,000											2 Battle-ships	35,000		2 Battle-ships	35,000
	Building.		1914	New York	27,000											2 Battle-ships	35,000		2 Battle-ships	35,000
	King George V.			Washington	35,000											2 Battle-ships	35,000		2 Battle-ships	35,000
	Prince of Wales			North Carolina	35,000											2 Battle-ships	35,000		2 Battle-ships	35,000
	Duke of York			Indiana	35,000											2 Battle-ships	35,000		2 Battle-ships	35,000
	Heathly			Massachusetts	35,000											2 Battle-ships	35,000		2 Battle-ships	35,000
	Jellicoe			Alabama	35,000											2 Battle-ships	35,000		2 Battle-ships	35,000
	Lion			South Dakota	35,000											2 Battle-ships	35,000		2 Battle-ships	35,000
	Temeraire			20 ships, including 6 building.	648,200											2 Battle-ships	35,000		2 Battle-ships	35,000
	19 ships, including 7 building	623,600					9 ships +	272,070		4 ships building	140,000		4 ships building	140,000		2 ships building	70,000		2 ships building	70,000

- 2 35,000 ton battleships are projected.

† The number of battleships building is not known.

TABLE III.—BATTLE-CRUISERS WITH 14-IN. GUNS AND UPWARDS.

[illegible]

TABLE VI.—CRUISERS.

Note.—Vessels under construction in *italics*. Cruisers marked * have guns above 6.1-in.

BRITISH EMPIRE.			UNITED STATES.			JAPAN.			FRANCE.			ITALY.			SOVIET UNION.			GERMANY.		
Speed.	Name.	Standard Displacement.	Speed.	Name.	Standard Displacement.	Speed.	Name.	Standard Displacement.	Speed.	Name.	Standard Displacement.	Speed.	Name.	Standard Displacement.	Speed.	Name.	Standard Displacement.	Speed.	Name.	Standard Displacement.
kts.		tons.	kts.		tons.	kts.		tons.	kts.		tons.	kts.		tons.	kts.		tons.	kts.		tons.
32½	London *	9,850	33	Omaha	10,000	33½	Nachi *	10,000	33½	Tourville *	10,000	35	Trento *	10,000	29	Proflern	7,200	32	Emden	5,400
32½	Devonshire *	9,850	33	Milwaukee	10,000	33	Mayko *	10,000	32	Duquesne *	10,000	35	Trieste *	10,000	29½	Cheroneva	7,600	32	Königsberg	5,400
32½	Shropshire *	9,850	33	Cincinnati	10,000	33	Asigara *	10,000	32	Sudren *	10,000	35	Taranto *	10,000	32	Ultrahina	7,600	32	Karlruhe	5,400
32½	Sussex *	10,000	33	Raleigh	10,000	33	Kako *	10,000	33	Duguay-Trouin	7,249	28	Quarto *	2,184	32	Komintern	6,675	32	Köln *	5,000
31½	Berwick *	10,000	33	Decatur	10,000	33	Nagato *	10,000	33	La Motte-Picquet	7,249	28	Barl *	2,184	18	Aurora	6,730	32	Leipzig	5,000
31½	Corwall *	10,000	33	Richmond	10,000	33	Furudaka *	7,100	33	Primaugnet	5,886	27½	San Giorgio *	5,886	29½	Kavkas *	7,600	32	Nürnberg *	5,000
31½	Kent *	9,850	33	Concord	10,000	33	Kingasa *	7,100	33	Emile Bertin	5,886	37	Alberto da	5,886	35	Minsk	3,000	32	Prinz Eugen	10,000
31½	Suffolk *	10,000	33	Trenton	10,000	33	Aoba *	5,195	33	Colbert *	5,886	37	Guiseano	5,886	35	Lenningrad	3,000	32	Bücher *	10,000
31½	Cumberland *	10,000	33	Memphis	10,000	33	Senda *	5,195	33	Foch *	5,886	37	Barbano	5,886	35	Mart	3,500	32	Admiral	10,000
31½	Australia (A) *	9,870	33	Salt Lake	10,000	33	Nagara	5,195	33	Dupleix *	5,886	37	Colleoni	5,886	35	Prinz Eugen	10,000	32	"K" Hipper	10,000
33	Emerald	7,850	33	City *	9,100	33	Shinzu	5,195	33	Jeanne d'Arc	6,496	37	Bartolomeo	5,089	35	Prinz Eugen	10,000	32	"M"	10,000
33	Enterprise	7,850	33	Pensacola *	9,100	33	Kinu *	5,195	33	Algerie *	6,496	37	Giov. della	5,089	35	Prinz Eugen	10,000	32	"N"	10,000
30½	Edinburgh	9,770	32½	Northamp-	9,050	33	Abukuma	6,170	31	La Galissonnière	10,000	37	Bande Nere	10,000	35	Prinz Eugen	10,000	32	"N"	10,000
30½	Probleher	9,800	32½	ton *	9,050	33	Natori	6,170	31	Jean de Vienne	10,000	37	Zara *	10,000	35	Prinz Eugen	10,000	32	"N"	10,000
29½	Hawkins	9,800	32½	Chester *	9,200	33	Iandzu	6,170	31	Gloire *	10,000	37	Flume *	10,000	35	Prinz Eugen	10,000	32	"N"	10,000
29	Despatch	9,800	32½	Louisville *	9,050	33	Yura	6,170	31	Marsellaise	7,600	37	Gortia *	10,000	35	Prinz Eugen	10,000	32	"N"	10,000
29	Dionede	9,800	32½	Chicago *	9,300	33	Kuma	6,170	31	Montcalm	7,600	37	Armando Pias	5,008	35	Prinz Eugen	10,000	32	"N"	10,000
29	Delhi	9,800	32½	Houston *	9,050	33	Tama	6,170	31	Georges Leygues	7,600	37	Luigi Cadorna	5,008	35	Prinz Eugen	10,000	32	"N"	10,000
29	Dunedin	9,800	32½	Augusta *	9,050	33	Kitakami	6,170	31	De Grasse *	8,000	37	Fola *	10,000	35	Prinz Eugen	10,000	32	"N"	10,000
29	Danae	9,800	32½	Portland *	9,000	33	Kiso	6,170	31	Chalcaurenaut	8,000	37	Montecucoli	6,941	35	Prinz Eugen	10,000	32	"N"	10,000
29	Dauntless	9,800	32½	Indiana *	9,000	33	Ol	6,170	31	Guichen	8,000	37	Attendolo	6,941	35	Prinz Eugen	10,000	32	"N"	10,000
29	Dragon	9,800	32½	polia *	9,000	33	Yubari	6,170	31	Chalcaurenaut	8,000	37	E. Filliberto	7,283	35	Prinz Eugen	10,000	32	"N"	10,000
29	Capetown	9,800	32½	New	9,000	33	Tenryu	6,170	31	Guichen	8,000	37	E. di Savola	7,283	35	Prinz Eugen	10,000	32	"N"	10,000
29	Calro	9,800	32½	Orleans *	9,050	33	Tataya	6,170	31	Guichen	8,000	37	Duca degli	7,894	35	Prinz Eugen	10,000	32	"N"	10,000
29	Calcutta	9,800	32½	Aetoria *	9,050	33	Takao *	6,170	31	Guichen	8,000	37	Garibaldi	7,894	35	Prinz Eugen	10,000	32	"N"	10,000
29	Carlate	9,800	32½	Minneapolis *	9,050	33	Atago *	6,170	31	Guichen	8,000	37	Abruzzi	7,894	35	Prinz Eugen	10,000	32	"N"	10,000
29	Colombo	9,800	32½	Tuscaloosa *	9,075	33	Chokai *	6,170	31	Guichen	8,000	37	Abruzzi	7,894	35	Prinz Eugen	10,000	32	"N"	10,000
29	Carfax	9,800	32½	San	9,075	33	Maya *	6,170	31	Guichen	8,000	37	Abruzzi	7,894	35	Prinz Eugen	10,000	32	"N"	10,000
29	Coventry	9,800	32½	Francisco *	9,050	33	Mogami	6,170	31	Guichen	8,000	37	Abruzzi	7,894	35	Prinz Eugen	10,000	32	"N"	10,000
29	Curlew	9,800	32½	Quincy *	9,400	33	Mikuma	6,170	31	Guichen	8,000	37	Abruzzi	7,894	35	Prinz Eugen	10,000	32	"N"	10,000
29	Ceres	9,800	32½	Vincennes *	9,400	33	Suzuya	6,170	31	Guichen	8,000	37	Abruzzi	7,894	35	Prinz Eugen	10,000	32	"N"	10,000
29	Curacao	9,800	32½	Savannah	9,400	33	Kunano	6,170	31	Guichen	8,000	37	Abruzzi	7,894	35	Prinz Eugen	10,000	32	"N"	10,000
29	Caledon	9,800	32½	Nashville	9,400	33	Yahagi	6,170	31	Guichen	8,000	37	Abruzzi	7,894	35	Prinz Eugen	10,000	32	"N"	10,000
29	Calypso	9,800	32½	Brooklyn	10,000	33	Hirado	6,170	31	Guichen	8,000	37	Abruzzi	7,894	35	Prinz Eugen	10,000	32	"N"	10,000
29	Caradoc	9,800	32½	Philadelphia	10,000	33	Tone	6,170	31	Guichen	8,000	37	Abruzzi	7,894	35	Prinz Eugen	10,000	32	"N"	10,000
29	Adelaide (A) *	5,100	32½	Wichita	10,000	33	Tsushima	6,170	31	Guichen	8,000	37	Abruzzi	7,894	35	Prinz Eugen	10,000	32	"N"	10,000
32½	Norfolk *	9,925	32½	Phenix	10,000	33	Tsushima	6,170	31	Guichen	8,000	37	Abruzzi	7,894	35	Prinz Eugen	10,000	32	"N"	10,000
32½	Donetsk *	9,975	32½	Phenix	10,000	33	Tsushima	6,170	31	Guichen	8,000	37	Abruzzi	7,894	35	Prinz Eugen	10,000	32	"N"	10,000
32½	York *	9,350	32½	Phenix	10,000	33	Tsushima	6,170	31	Guichen	8,000	37	Abruzzi	7,894	35	Prinz Eugen	10,000	32	"N"	10,000
32½	Essex *	8,300	32½	Phenix	10,000	33	Tsushima	6,170	31	Guichen	8,000	37	Abruzzi	7,894	35	Prinz Eugen	10,000	32	"N"	10,000
32½	Leander (N.Z.) *	7,140	32½	Phenix	10,000	33	Tsushima	6,170	31	Guichen	8,000	37	Abruzzi	7,894	35	Prinz Eugen	10,000	32	"N"	10,000

(c) Estimated.

(A) Australian Navy.

TABLE VI.—CRUISERS (*continued*).

BRITISH EMPIRE.			UNITED STATES.			JAPAN.			FRANCE.			ITALY.			SOVIET UNION.			GERMANY.		
Speed.	Name.	Standard Displacement.	Speed.	Name.	Standard Displacement.	Speed.	Name.	Standard Displacement.	Speed.	Name.	Standard Displacement.	Speed.	Name.	Standard Displacement.	Speed.	Name.	Normal Displacement.	Speed.	Name.	Displacement.
kts.		tons.	kts.		tons.	kts.		tons.	kts.		tons.	kts.		tons.	kts.		tons.	kts.		tons.
32½	Achilles (N.Z.)	7,030		Albatross	8,000															
	Neptune	7,176		San Juan	8,000															
32½	Orion	7,215		Juncos	8,000															
	Ajax	6,985		San Diego	8,000															
32½	Sydney (A)	6,330																		
	Arethusa	5,220																		
32½	Galatea	5,220																		
32½	Amphion	7,040																		
32½	Robert (A)	6,980																		
32½	Penelope	5,270																		
32½	Aurora	5,270																		
	Southampton																			
	Newcastle	9,100																		
	Glasgow																			
32	Sheffield																			
	Birmingham																			
	Liverpool	9,400																		
	Manchester																			
	Gloucester																			
	Belfast	10,000																		
	Edinburgh																			
	Jamaica																			
	Gambia																			
	Lyons																			
	Kenya	8,000																		
	Mauritius																			
	Nigeria																			
	Trinidad																			
	Charybdis																			
	Cleopatra																			
	Scylla																			
	Dido																			
	Euryalus	8,450																		
	Naiad																			
	Phoebe																			
	Sirius																			
	Romance																			
	Herminette																			
	† 83 ships, including 21 building.	582,295		41 ships, including 12 building.	363,176		37 ships, including 2 building.	249,005	† 21 ships, including 3 building.	173,729	† 23 ships.	165,095	24 ships, including 16 building.	145,305	13 ships, including 7 building.	99,400				

(A) Australian Navy.

(N.Z.) New Zealand Division.

† One cruiser minelayer (Adventure, 6,740 tons) in addition. Seven further cruisers are to be laid down in 1937.

‡ To this French cruiser tonnage must be added 32 vessels of an average displacement of 2,432 tons built and building. These vessels are classed in France as contre-torpilleurs.

§ 12 light cruisers are projected.

TABLE VII.—AIRCRAFT AND SEAPLANE CARRIERS.

BRITISH EMPIRE.			UNITED STATES.			JAPAN.			FRANCE.			ITALY.			SOVIET UNION.			GERMANY.		
Launched.	Name.	Standard Displacement.	Launched.	Name.	Standard Displacement.	Launched.	Name.	Standard Displacement.	Launched.	Name.	Standard Displacement.	Launched.	Name.	Standard Displacement.	Launched.	Name.	Standard Displacement.	Launched.	Name.	Standard Displacement.
1916	Furious	22,450 tons.	1912	Langley**	11,500 tons.	1921	Hosho	7,470 tons.	1914	Béarn†	22,146 tons.	1923	Miraglia††	4,960 tons.		Krasni-Moryak	7,600 tons.		2 building	19,250
1917	Argus	14,000	1925	Lexington	33,000	1921	Kaga†	28,800	1929	Commandant Teste††	10,000									
1917	Pegasus††	6,900	1925	Saratoga	33,000	1920	Notoro†	14,050												
1919	Hermes	10,850				1922	Kamoi†	17,000												
1918	Eagle†	22,600	1933	Ranger	14,500	1925	Akagi	26,900												
1916	Courageous	22,500				1931	Ryūjō	7,100												
1928	Albatross	4,800	1936	Yorktown	19,900	1933	Taipei	10,000												
	(A)		1936	Enterprise	14,700	1935	Soryu	10,050												
1916	Glorious	22,500		Wasp	14,700	1936	Chitose††	9,000												
1937	Ark Royal			Hornet...	20,000		Building:													
	Illustrious					1937	Hiryu	10,050												
	Victorious					1937	Koryu	10,050												
	Formidable	25,000				1937	Chitose††	9,000												
	Indomitable					1938	Mitsuo††	9,000												
	Implacable																			
	14 ships, including 6 building	264,600		8 ships, including 2 building.	166,500		13 ships, including 4 building	166,570		4 ships, including 2 building.	68,146		1 ship.	4,960		1 ship and 1 building	7,600		2 vessels building	38,500

* Completed as battle-cruisers 1917; converted to aircraft-carriers under the Washington Treaty.

† Designed as battleships

†† Seaplane carrier, used for experimental work. Not counted as part of the war fleet, under the terms of the London Naval Treaty.

‡ Converted in 1937 into aircraft tender.

‡‡ Aviation transport, a special type under the terms of London Naval Treaty.

‡‡‡ Seaplane carrier.

NOTE.—Vessels of which the names are printed in italics are under construction.

BRITISH AND FOREIGN AIRCRAFT TYPES

BRITISH NAVAL AIRCRAFT TYPES.

FLEET AIR ARM.

Maker, Number, Name.	Type, Number of Seats.	Engine H.P., Make.	Max. speed, m.p.h.	Ceiling, in feet.
Hawker Nimrod.	Single-seater Fighter. Float or Ship Plane.	480 Rolls-Royce "Kestrel."	192.5	26,900
Hawker Osprey.	Two-seater Fighter. Reconnaissance.	525 Rolls-Royce "Kestrel."	174.5	22,850
Blackburn Shark.	Torpedo Spotter Reconnaissance. Three-seater.	720 Armstrong-Siddeley "Tiger."	150	—
Fairey Swordfish.	Torpedo Spotter Reconnaissance. Three-seater.	700 Bristol "Pegasus."	150	—
Supermarine Walrus.	Fleet Spotter Reconnaissance. Three-seater.	700 Bristol "Pegasus"	123	—
Fairey Seafox.	Light Reconnaissance. Two-seater. Seaplane.	350 Napier Rapier.	117	—
Blackburn Skua.	Fighter. Dive-Bomber.	—	—	—

**R.A.F. SHORE-BASED AIRCRAFT WHICH MAY BE EMPLOYED IN
CO-OPERATION WITH NAVAL FORCES.***

Maker, Number, Name.	Type, Number of Seats.	Engine H.P. Make.	Max. speed, m.p.h.	Ceiling, in feet.
Vickers Vilde- beest.	Torpedo -Bomber. Two-seater.	587 Bristol "Pegasus."	141	16,250
Supermarine Scapa.	Reconnaissance Fly- ing Boat. Five- seater.	Two 525 Rolls-Royce "Kestrel."	143	14,950
Short Singapore III.	Reconnaissance Fly- ing Boat. Five- seater.	Four 525 Rolls-Royce "Kestrel."	136	13,600
Saunders-Roe London.	Reconnaissance Fly- ing Boat. Five- seater.	Two 587 Bristol "Pegasus."	135	14,700
Supermarine Stranraer.	Reconnaissance Fly- ing Boat. Six-seater.	Two 870 Bristol "Pegasus" X.	161	18,500
Short Sunder- land.	Reconnaissance Fly- ing Boat. Six-seater.	Four 840 Bristol "Pegasus" XXII.	210	—
Avro Anson.	General Reconnaiss- ance. Four-seater.	Two 310 "Cheetah" IX.	188	19,500
Lockheed Hudson.	General Reconnaiss- ance. Four-seater.	Two 850 Wright Cyclones.	—	—

* Aircraft from the Bomber and Fighter Commands of the Metropolitan Air Force are also employed in Combined Exercises.

AIRCRAFT ENDURANCE.

Hawker Nimrod, 3½ hours at 114 m.p.h. ; Hawker Osprey, 4½ hours at 107 m.p.h. ; Supermarine Walrus, 4½ hours at 95 m.p.h.

Short Singapore III, 8½ hours at 100 m.p.h. ; Supermarine Scapa, 10½ hours at 102 m.p.h. ; Saunders-Roe London, 10 hours at 98 m.p.h. ; Supermarine Stranraer, 10½ hours at 98 m.p.h.

FOREIGN NAVAL AIRCRAFT TYPES.

United States Naval Air Service.

AIRCRAFT, HEAVIER-THAN-AIR.

Maker, Number, Name.	Type, Number of Seats.	Engine H.P. Make.	Max. speed, m.p.h.	Celling (Service), in feet.
Grumman. F3F-1.	Single-seater Fighter.	750 "Twin-Wasp."	240	29,000
Grumman. F3F-2.	Single-seater Fighter.	"Cyclone."	—	—
Grumman. F3F-3.	Single-seater Fighter.	—	—	—
Vought. SB2U-1.	Two-seater Scout Bomber.	750 "Twin-Wasp."	205	24,600
Curtiss. SBC-3.	Two-seater Scout Bomber.	—	—	—
Curtiss. SBC-4.	Two-seater Scout Bomber.	—	—	—
Douglas. TBD-1.	Two-seater Torpedo Bomber.	850 "Twin-Wasp."	270	—
Northrop. BT-1.	Dive Bomber. Crew of 2.	750 "Twin-Wasp."	—	—
Curtiss. SOC-3.	Two-seater Scout. Observation.	550 "Twin-Wasp."	160	—
Consolidated. PBY-1.	Multi-seater. Patrol Flying Boat.	Two 900 "Twin-Wasp."	190	12,000
Grumman. J2F-1.	Utility Aircraft.	775 "Cyclone."	180	21,000

All engines are air-cooled. "Wasp" engines are made by Pratt and Whitney. "Cyclone" engines are made by Curtiss-Wright.

United States—continued.**BASES.**

The United States have the following naval flying bases on shore :—

Pensacola, Florida (Training) ;
San Diego, California (Fleet Base and Marines) ;
Hampton Roads, Virginia (Fleet Base) ;
Lakehurst, New Jersey (Lighter-than-air craft) ;
Pearl Harbour, Hawaii (Fleet Base) ;
Coco-Solo, Canal Zone (Fleet Base) ;
Anacostia, D.C. (Experimental) ;
Seattle, Washington (Reserve Training Base) ;
Squantum, Mass. (Reserve Training Base) ;
Floyd Bennet Field, Brooklyn (Reserve Training Base) ;
Philadelphia (Reserve Training Base) ;
Norfolk, Va. (Reserve Training Base) ;
Miami, Fla. (Reserve Training Base) ;
Great Lakes, Ill. (Reserve Training Base) ;
Grosse Ile, Mich. (Reserve Training Base) ;
Minneapolis, Minn. (Reserve Training Base) ;
St. Louis, Mo. (Reserve Training Base) ;
Kansas City, Kansas (Reserve Training Base) ;
Long Beach, Calif. (Reserve Training Base) ;
Oakland, Calif. (Reserve Training Base) ;
Quantice, Va. (Fleet Marine Base) ;
St. Thomas, V.I. (Fleet Marine Base) ;
Sitka, Alaska (Patrol Flying-Boat Base) ;
Alamada, Calif. (Fleet Base) ;
San Pedro, Calif. (Fleet Base).

AIRCRAFT, LIGHTER-THAN-AIR.

The ZMC-2 was manufactured by the Aircraft Development Corporation, and delivered to the U.S. Navy in September, 1929. She is used at Lakehurst for training.

In addition to the ZMC-2, there are three non-rigid airships, K-1, J-4, and G-1.

Four non-rigid blimps, ranging from 208,000 to 375,000 cubic feet in capacity, have been turned over to the Navy by the Army, as a result of the Army's decision to abandon this type of aircraft. They will be used for training purposes.

A non-rigid airship, of 400,000 cubic feet capacity, for coastal patrol work was completed in December, 1938.

Japanese Naval Air Service.

Type.	Crew.	Engine and H.P.	Weight, lbs.	Speed, m.p.h.
<i>Fighter.</i>				
Navy 96	1	—	—	205
<i>Reconnaissance.</i>				
Navy 94	3	Navy Type 91, 500	5,500	140
Navy 95	2	Kotobuki, 600	—	150
<i>Bomber.</i>				
Navy 89	3	Hispano, 650	6,750	144
Navy 92	3	Hiro, 650	6,700	150
Navy 96	3	—	—	—
<i>Flying Boat.</i>				
Short 90-II.	6	3 Rolls-Royce, 800	28,600	137
Navy 91	—	2 Hiro, 650	—	137

French Naval Air Service.

Maker, Number, Name.	Type, Number of Seats.	Engine H.P. Make.	Max. Speed, m.p.h.	Ceiling, Endurance in hours.
Breguet "Bizerte" Flying Boat.	Long Reconnaissance 5-6	Three 650 "Gnome- Rhone."	130	24,000 10
C.A.M.S. 37 Flying Boat.	Short Reconnaissance 3	600 "Hispano."	108	14,760 5
C.A.M.S. 55 Flying Boat.	Long Reconnaissance 3-5	Two 600 "Hispano."	130	14,700 7
Dewoitine 373 Landplane.	Single-seater Fighter (for Aircraft Carrier "Bearn.")	690 "Gnome-Rhone."	236	36,000 2
Gourdou- Lesseure 810 Float Sea- plane.	Spotter Reconnaissance 2	450 "Gnome-Rhone."	120	16,500 5
Latécoère 302 "Croix du Sud" Flying Boat.	Long Reconnaissance 4	Four 650 "Hispano."	130	15,000 10
Latécoère 29 Float Sea- plane.	Torpedo Bomber 3	650 "Hispano."	129	15,500 4
Latécoère 382 Flying Boat.	Long Reconnaissance	Two 650 "Hispano."	125	15,400
Levasseur P.L.7 Landplane.	Bomber 2-3 seater (marine type, can alight on water.)	600 "Hispano."	108	14,000 5
Levasseur P.L.15 Float Sea- plane.	Bomber 2	600 "Hispano."	125	14,000 4
Levasseur P.L.10 Avion Marin.	Short Reconnaissance 3	600 "Hispano."	120	16,400 4
Liore- Nieuport 70 "Loire" Flying Boat.	Long Reconnaissance 5	Three 500 "Hispano."	130	19,864 9

French Naval Air Service—continued.**BASES.**

The bases and aerodromes of the Naval Air Service are as follows:—

1st Region (Cherbourg)—

Chantereyne (Sqdns. 1T1 and 1B1, Seaplanes; E2 and 1S1 Flying Boats).

2nd Region (Brest)—

Lanveoc Poulmic (Sqdns. 2S1, E4 and E6, Flying Boats);
Brest (Captive Balloons);
Rochefort (Training);
Hourtin (Training).

3rd Region (Berre)—

St. Raphael (Experimental and Sqdn. E5 Flying Boats);
Berre (Sqdns. 3B1, 3B2, 4T1, Seaplanes, E1 and E3,
Flying Boats);
Hyères (Squadrons 7C2 Landplanes; 3S1, Flying Boats).

4th Region (Bizerta)—

Karouba (Sqdns. E7, 4S1, Flying Boats); Air Force
Loans to Naval Air Service; 4B1, 4B2, 4B3.
Bizerta (Captive Balloons).

AIRCRAFT, LIGHTER-THAN-AIR.

Lighter-than-air craft activities received a severe set-back when the "Dixmude" (ex-German L27) was lost with all hands off the coast of Sicily on December 20, 1923. The French Navy is now developing two classes of airship, the "Vedettes" and the "Escorteurs." The "Vedettes," of which there are nine, are of about 125,000 cubic feet capacity, speed of about 40 m.p.h., a crew of four, and endurances varying from 15 to 25 hours. The "Escorteurs," of which there are four, are of about 350,000 cubic feet, have a speed of about 40 m.p.h., a crew of six, and an endurance of about 40 hours.

Italian Naval Air Service.

Maker, Name, Number.	Type, Number of Seats.	Engine H.P. Make.	Max. Speed, m.p.h.	Ceiling Endurance in hours.
Alfa Romeo. RO43. Shiplane	Two-seater Recon- naissance.	610 "Piaggio."	200	— 6
Cant. Z501. Flying Boat.	Four-seater Recon- naissance.	850 "Asso. 750."	149	18,000 —
Cant. Z506B. Floatplane	Bomber-Reconnais- sance.	3-770 "Alfa Romeo."	240	13,000 —

**BRITISH AND FOREIGN
ORDNANCE TABLES**

VICKERS-ARMSTRONGS LIMITED—GUNS AND MOUNTINGS.

Tables Corrected by the Manufacturers, January, 1939.

NAVAL GUNS AND MOUNTINGS.

System	40 mm. 2-pdr.	40 mm. 2-pdr.	40 mm. 2-pdr.	47 mm. 3-pdr.	57 mm. 6-pdr.	4-in. 101.6 mm.	4-in. 101.6 mm.	4-7-in. 120 mm.	4-7-in. 120 mm.	5-11.8-in. 139.7 mm.	5-5-in. 139.7 mm.	5-906-in. 139.7 mm.
	Auto.	Auto.	Auto.	Semi- Auto.	Semi- Auto.	Semi- Auto.	Semi- Auto.	Semi- Auto.	Semi- Auto.	Semi- Auto.	Semi- Auto.	Semi- Auto.
Diameter of Bore	1.575	1.575	1.575	1.85	2.244	4	4	4.724	4.724	5.118	5.5	5.906
do.	40	40	40	47	57	101.6	101.6	120	120	139	139.7	139.7
Length of Bore	39.37	39.37	39.37	50	50	45	45	45	45	52	55	50
Weight of Gun	580	580	580	5 q. lb.	5 q. lb.	36 q.	36 q.	36 q.	36 q.	48	48	6.15
do.	268	297	297	5	5	2.304	2.304	3.000	3.000	4.470	4.740	6.858
Weight of Projectile	2	2	2	3.3	4.6	1.830	1.830	3.000	3.000	4.470	4.740	6.858
do.	0.91	0.91	0.91	3.3	4.6	1.830	1.830	3.000	3.000	4.470	4.740	6.858
Muzzle Velocity	2,000	2,461	2,461	2,800	2,752	3,000	3,000	2,780	2,780	3,000	3,000	2,940
do.	600	750	750	853	792	1,015	1,015	850	850	915	915	806
Muzzle Energy	54	84	84	180	287	1,565	1,565	2,616	2,616	4,245	4,953	5,995
do.	17.0	26	26	55.75	86.7	485	485	810	810	1,315	1,535	1,857
Penetration (W.I. at muzzle). . . . .	..	..	..	6.7	7.5	16	16	16.6	16.6	20	22	23
do. . . . .	..	..	..	170	190	405	405	430	430	510	560	565
Rounds per Minute	200	200	200	30	28	15	15	12	12	..	..	..
do.	1,676	1,676	1,676	11	11	3	3	4	4	9	9	9
Weight of Mounting and Shield	700	700	700	582	906	3,315	3,315	5,067	5,067	9,158	9,246	14,517
do. . . . .	..	..	..	1	1	7	7	7	7	10	10	10
Weight of Shield . . . . .	..	..	..	1	1	7	7	7	7	10	10	10
do. . . . .	..	..	..	1	1	7	7	7	7	10	10	10
Thickness of Shield . . . . .	..	..	..	60	80	380	380	394	394	965	965	1,118
do. . . . .	..	..	..	..	..	..	..	..	..	..	..	..
Angle of Elevation	85	85	85	20	20	30	30	35	35	45	45	45
Angle of Depression	5	5	5	20	10	10	10	10	10	10	10	10

The above guns are of all-steel construction.

VICKERS-ARMSTRONGS LIMITED—GUNS AND MOUNTINGS. NAVAL GUNS AND MOUNTINGS—continued.

	6-in. 152 mm.	6-in. 152 mm.	8-in. 203 mm.	8-in. 203 mm.	8-in. 203 mm.	9-2-in. 234 mm.	10-in. 254 mm.	12-in. 305 mm.	13-5-in. 343 mm.	14-in. 356 mm.	15-in. 381 mm.	16-in. 406 mm.
Diameter of Bore do.	6 45	6 45	8 43	8 43	8 50	9-2 233-7	10 254	12 306-8	13-5 342-9	14 355-6	15 381	16 406-2
Length of Bore do.	6 10 t. c.	6 10 t. c.	8 14 t. c.	8 14 t. c.	8 16 t. c.	9-2 16 t. c.	10 26 t. c.	12 43 t. c.	13-5 66 t. c.	14 80 t. c.	15 87 t. c.	16 105 t. c.
Weight of Gun do.	6 605 lb.	6 605 lb.	8 1225 lb.	8 1225 lb.	8 1225 lb.	9-2 1225 lb.	10 1225 lb.	12 1225 lb.	13-5 1225 lb.	14 1225 lb.	15 1225 lb.	16 1225 lb.
Weight of Projectile do.	45-36 kg.	45-36 kg.	60-4 kg.	60-4 kg.	60-4 kg.	9-2 60-4 kg.	10 60-4 kg.	12 60-4 kg.	13-5 60-4 kg.	14 60-4 kg.	15 60-4 kg.	16 60-4 kg.
Muzzle Velocity do.	2850 m.s.	2850 m.s.	3000 m.s.	3000 m.s.	3000 m.s.	9-2 3000 m.s.	10 3000 m.s.	12 3000 m.s.	13-5 3000 m.s.	14 3000 m.s.	15 3000 m.s.	16 3000 m.s.
Muzzle Energy do.	5795 m.t.	5795 m.t.	6240 m.t.	6240 m.t.	6240 m.t.	9-2 6240 m.t.	10 6240 m.t.	12 6240 m.t.	13-5 6240 m.t.	14 6240 m.t.	15 6240 m.t.	16 6240 m.t.
Penetration (W.I. at muzzle) do.	192 ins.	192 ins.	24 ins.	24 ins.	24 ins.	9-2 24 ins.	10 24 ins.	12 24 ins.	13-5 24 ins.	14 24 ins.	15 24 ins.	16 24 ins.
Rounds per Minute do.	10 do.	10 do.	10 do.	10 do.	10 do.	9-2 10 do.	10 10 do.	12 10 do.	13-5 10 do.	14 10 do.	15 10 do.	16 10 do.
Weight of Mounting and Shield do.	12 675 kg.	12 675 kg.	14 800 kg.	14 800 kg.	14 800 kg.	9-2 14 800 kg.	10 14 800 kg.	12 14 800 kg.	13-5 14 800 kg.	14 14 800 kg.	15 14 800 kg.	16 14 800 kg.
Weight of Shield do.	4 315 kg.	4 315 kg.	4 315 kg.	4 315 kg.	4 315 kg.	9-2 4 315 kg.	10 4 315 kg.	12 4 315 kg.	13-5 4 315 kg.	14 4 315 kg.	15 4 315 kg.	16 4 315 kg.
Thickness of Shield do.	1-5 & 1 ins.	1-5 & 1 ins.	1-5 & 1 ins.	1-5 & 1 ins.	1-5 & 1 ins.	9-2 1-5 & 1 ins.	10 1-5 & 1 ins.	12 1-5 & 1 ins.	13-5 1-5 & 1 ins.	14 1-5 & 1 ins.	15 1-5 & 1 ins.	16 1-5 & 1 ins.
do.	38 & 25-4 mm.	38 & 25-4 mm.	25 & 20 mm.	25 & 20 mm.	25 & 20 mm.	9-2 25 & 20 mm.	10 25 & 20 mm.	12 25 & 20 mm.	13-5 25 & 20 mm.	14 25 & 20 mm.	15 25 & 20 mm.	16 25 & 20 mm.
Angle of Elevation do.	30 deg.	30 deg.	70 deg.	70 deg.	70 deg.	9-2 70 deg.	10 70 deg.	12 70 deg.	13-5 70 deg.	14 70 deg.	15 70 deg.	16 70 deg.
Angle of Depression do.	5 deg.	5 deg.	3 deg.	3 deg.	3 deg.	9-2 3 deg.	10 3 deg.	12 3 deg.	13-5 3 deg.	14 3 deg.	15 3 deg.	16 3 deg.

The above guns are of all-steel construction. Guns of steel and wire construction are manufactured for some of the above having approximately the same characteristics.

	2-953-in. 75 mm. Field.	4-134-in. 105 mm. Howr.	4-134-in. 105 mm. Field.	4-134-in. 105 mm. Field.	4-134-in. 105 mm. Field.	6-in. 152 mm. Howr. On 105 mm. Carriage.	6-in. 152 mm. Field.	8-in. 203 mm. Railway.	8-208-in. 210 mm. Semi- Mobile.	12-in. 305 mm. Railway.	15-in. 381 mm. Railway.
Diameter of Bore	2-953	4-134	4-134	4-134	4-134	6	6	8	8-208	12	15
do. do.	75	105	105	105	105	152	152	203	210	305	381
Length of Bore	30	21	26	35	45	20	45	50	40	50	45
Weight of Gun	394	584	584	584	584	t. c.	t. c.	t. c.	t. c.	t. c.	t. c.
do. do.	14-33	26-45	33-07	35-27	35-27	1 6 2	1 6 2	1 5 5	10 19	43 10	87 0
Weight of Projectile	6-5	12-0	15-0	16-0	16-0	1,346	1,346	15,500	11,125	44,200	88,400
do. do.	1,952	2,461	2,000	2,543	2,543	90-17	90-17	216	286-6	850	1,951
Muzzle Velocity	595	602	610	610	610	40-9	40-9	2,600	2,600	2,933	2,500
do. do.	379	474	474	474	474	1,591	1,591	884	705	801	780
Muzzle Energy	117	186	284	284	284	485	485	14,680	13,515	50,705	84,550
do. do.	25	10	10	10	10	5,730	5,730	4,625	4,185	15,705	26,185
Rounds per Minute	t. c.	t. c.	t. c.	t. c.	t. c.	4	4	4	3	5 in 2 mins.	9
Weight of Mounting and Shield	1 1 1 25	19 1 16	19 2 0	19 2 0	19 2 0	t. c.	t. c.	t. c.	t. c.	t. c.	t. c.
do. do.	1,091	985	1,498	2,388	2,388	2 11 3	2 11 3	62 8	28	177,800	275
Weight of Shield	80-7	87	38	38	38	7,820	7,820	63,400	28,450	177,800	275
do. do.	16	125	16	16	16	No Shield	No Shield	No Shield	No Shield	No Shield	No Shield
Thickness of Shield	4	3-2	4-06	4-06	4-06	..	..	..	..	..	..
do. do.	40	40	45	45	45	..	..	..	..	..	..
Angle of Elevation	deg.	deg.	deg.	deg.	deg.	45	45	50	50	35 1/2	40
Angle of Depression	deg.	deg.	deg.	deg.	deg.	5	5	0	2	0	0

	TANK GUNS.		FOR VICKERS CARDEN LOYD VEHICLE.		MOUNTAIN HOWITZERS.		LANDING GUN.	
	57 mm. 6-pdr. Semi-Auto.	47 mm. 3-pdr. Semi-Auto.	40 mm. 2-pdr. Semi-Auto.	47 mm. 3-pdr.	2-953-in. (75 mm.) Jointed.	4-134-in. (105 mm.) Jointed.	2-953 in. (75 mm.) Jointed.	
Diameter of Bore	2-244	1-85	1-575	1-85	2-953	4-134	2-953	
do. do.	57	47	40	47	75	105	75	
Length of Bore	27	35	50	21	18	11	18	
Weight of Gun	c. 2	c. 2	c. 2	lb.	c. 3	c. 5	c. 3	
do. do.	2 14	2 0	2 13	165	2 4	0 0	2 4	
Weight of Projectile	133	127	108	74-8	179-8	254	179-8	
do. do.	6	3-3	2	3-3	14-33	59-45	14-33	
Muzzle Velocity	2-72	1-5	-91	1-5	6-5	12	6-5	
do. do.	1,200	1,854	2,600	A.P. Shell. H.E. Shell.	1,450	1,148	1,450	
Muzzle Energy	366	565	792	1,600	442	350	442	
do. do.	60	79	93-7	488	210	242	210	
Rounds per Minute	18-6	24-5	29	58-6	65-0	74-5	65-0	
Weight of Mounting and Shield	..	..	..	18-1	18	10	..	
do. do.	3 21	2 0	2 14	A.P. Shell. H.E. Shell.	c. 9	c. 12	c. 11	
Weight of Shield	149	127	120-65	1,600	9 476	622	559	
do. do.	..	..	15-25	792	c. 1	c. 3	c. 1	
Thickness of Shield	..	..	6-92	565	63-5	92	65-75	
do. do.	..	..	4	488	144	16	16	
Angle of Elevation	deg.	deg.	deg.	22-2	3-6	4-0	4-0	
Angle of Depression	deg.	deg.	deg.	18-1	45	45	45	

VICKERS-ARMSTRONGS LIMITED—GUNS AND MOUNTINGS. GUNS MOUNTED ON AIRCRAFT.

System	*-303-in. (7.7 mm.) for aircraft gun.	*-303-in. (7.7 mm.) Observer's gun.	*-303-in. (7.7 mm.) Pilot's gun.	.5-in. (12.7 mm.) Observer's gun.	.5-in. (12.7 mm.) Pilot's gun.	1.457-in. (37 mm.) Observer's gun.	1.575-in. (40 mm.) Observer's gun.
Diameter of Bore . . . ins.	.303	.303	.303	.5	.5	1.457	1.575
do. mm.	7.7	7.7	7.7	12.7	12.7	37	40
Length of Bore . . . cal.	72	79.2	93.7	50	62.2	39.5	40
Weight of Gun . . . lb.	20.5	25	26.5	45	52.5	200	234
do. kg.	9.3	11.3	12	20.4	23.8	90.72	106
Weight of projectile . . lb.	174 grs.	174 grs.	174 grs.	565 grs.	565 grs.	1.47	2
do. kg.	11.3 grms.	11.3 grms.	11.3 grms.	36.6 grms.	36.6 grms.	0.666	0.91
Muzzle Velocity . . . f.s.	2,400	2,400	2,440	2,450	2,550	1950	2,300
do. m.s.	732	732	744	746	777	594	700
Muzzle Energy . . . f.t.	0.9	0.9	1	3.38	3.64	38.72	73
do. m.t.	0.28	0.28	0.31	1.04	1.125	11.98	22.6
Rounds per Minute . . .	900-1000	650-750	900-1000	450-650	450-650	100	..
Weight of Mounting . . lb.	5	..	..	..	..	102	432
do. kg.	2.3	..	..	..	..	46	196
Angle of Elevation . . deg.	90	..	..	..	..	55	60
Angle of Depression . . deg.	90	..	..	..	..	40	30

MACHINE GUNS—ANTI-AIRCRAFT.

System	*-303-in. (7.7 mm.) Vickers Recoil operated.	*-303-in. (7.7 mm.) Vickers-Berthier Gas operated.	.5-in. (12.7 mm.) Vickers Recoil operated.	.5-in. (12.7 mm.) Vickers Recoil operated.
Diameter of Bore . . . ins.	.303	.303	.5	.5
do. mm.	7.7	7.7	12.7	12.7
Length of Bore . . . cal.	93.7	72	62.2	90
Weight of Gun . . . lb.	32	22	52.5	101
do. kg.	14.5	10	23.8	40.6
Weight of Projectile . . lb.	174 grs.	174 grs.	565 grs.	690 grs.
do. kg.	11.3 grms.	11.3 grms.	36.6 grms.	44.7 grms.
Muzzle Velocity . . . f.s.	2,440	2,400	2,550	3,000
do. m.s.	744	732	777	914
Muzzle Energy . . . f.t.	1	0.9	3.64	6.15
do. m.t.	.31	0.28	1.125	1.9
Rounds per minute . . .	500-600	450-500	450-650	350-450

* This gun can be adapted to fire any pattern of rifle calibre ammunition.

VICKERS-ARMSTRONGS LIMITED—GUNS AND MOUNTINGS. ANTI-AIRCRAFT GUNS.

System	40 mm. 2-pdr.	40 mm. 2-pdr.	40 mm. 2-pdr.	40 mm. 2-pdr.	47 mm. 3-pdr.	Mobile 75 mm. 40 Calibre	Mobile 75 mm. 40 Calibre	3-inch	4-in.	4-in.	4-in.	105 mm. 45 Calibre	4-7-in.
	Auto.	Auto.	Auto.	Auto.	Semi- Auto.	Semi- Auto.	Semi- Auto.	Semi- Auto.	Semi- Auto.	Semi- Auto.	Semi- Auto.	Semi- Auto.	Semi- Auto.
Construct'on	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel
Diameter of bore	1.575	1.575	1.575	1.575	1.85	2.953	2.953	3	4	4	4	4.134	4.724
Length of bore	30.37	40	40	40	47	75	75	76.2	101.6	101.6	101.6	105	120
Weight of gun	lb.	lb.	lb.	lb.	50	40	46	50	45	50	45	45	40
Weight of projectile	590	655	655	655	50	11	13	1	1	2	2	2	2
Muzzle velocity	2,000	2,461	2,461	2,461	2,800	2,461	2,461	2,560	2,700	2,700	2,700	2,625	2,560
Muzzle energy	54	84	84	84	180	602	695	650	823	823	823	800	780
Rounds per minute	17	26	32	32	55.75	186	215	201	1,565	1,565	1,565	1,685	2,205
Weight of mounting	200	200	130-140	130-140	30	..	..	25	18	18	18	..	12
Angle of elevation	c. q. lb.	c. q. lb.	c. q. lb.	c. q. lb.	c. q. lb.	t. c. q. lb.	t. c. q. lb.	t. c. q.	t. c. q. lb.	t. c. q. lb.	t. c. q. lb.	t. c. q.	t. c. q. lb.
Angle of depression	14 3 24	19 0 0	19 0 0	19 0 0	18 2 3	2 5 2 23	2 5 2 18	2 18 2	6 14 0 18	10 5 1 0	10 5 1 0	5 18 2	9 0 1 0
	760	965	965	965	941.1	2,322	2,320	2,971	6815	10,427	10,427	6,020	9157.1
	85	90	90	90	80	90	90	90	90	90	90	90	90
	5	5	5	5	5	0	0	5	5	5	5	5	5

VICKERS-ARMSTRONGS LIMITED—GUNS AND MOUNTINGS. MACHINE AND AUTOMATIC GUNS.

	*.303-in. (7.7-mm.) Observer's Gun for Aircraft.	*.303-in. (7.7-mm.) Land Naval.	*.303-in. (7.7-mm.) Gun for Aircraft.	*.303-in. (7.7-mm.) Infantry.	.5-in. (12.7- mm.) Observer's Gun for Aircraft.	.5-in. (12.7- mm.) Pilot's Gun for Aircraft.	.5-in. (12.7- mm.) Land and Naval.	.5-in. (12.7- mm.) Anti- Aircraft and Naval.	.5-in. (12.7-mm.) for Anti- Aircraft Tank.	1.457-in. (37-mm.) Observer's Gun for Aircraft.	1.575-in. (40-mm.) 2-pr. Anti- Aircraft.	1.575-in. (40-mm.) 2-pr. Auto. Aircraft.	1.575-in. (40-mm.) 2.2-pr. Anti- Aircraft.
	Vickers Recoil operated.	Vickers Recoil operated.	Vickers- Arm- strongs Gas operated.	Vickers- Berthier Gas operated.	Vickers Recoil operated.	Vickers Recoil operated.	Vickers Recoil operated.	Vickers Recoil operated.	Vickers- Arm- strongs Gas operated.	Vickers Recoil operated.	Vickers Recoil operated.	Vickers Recoil operated.	Vickers Recoil operated.
Diameter of Bore	.303	.303	.303	.303	.5	.5	.5	.5	.5	1.457	1.575	1.575	1.575
do. do.	7.7	7.7	7.7	7.7	12.7	12.7	12.7	12.7	12.7	37	40	40	40
Length of Bore	79.2	93.7	72	72	50	62.2	62.2	90	72	39.5	39.37	50	50
Weight of Gun	25	32	20.5	22	45	52.5	52.5	101	70	200	590	655	1,433
do. do.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.
Weight of Projectile	174	174	174	174	565	565	565	690	690	147 lb.	2 lb.	2 lb.	2.2 lb.
do. do.	grs.	grs.	grs.	grs.	grs.	grs.	grs.	grs.	grs.	grs.	grs.	grs.	grs.
Muzzle Velocity	2,400	2,440	2,400	2,400	2,450	2,550	2,550	3,000	2,800	1,950	2,000	2,461	2,625
do. do.	f.s.	f.s.	f.s.	f.s.	f.s.	f.s.	f.s.	f.s.	f.s.	f.s.	f.s.	f.s.	f.s.
Muzzle Velocity	732	744	732	732	746	777	777	914	853	594	600	750	800
do. do.	m.s.	m.s.	m.s.	m.s.	m.s.	m.s.	m.s.	m.s.	m.s.	m.s.	m.s.	m.s.	m.s.
Muzzle energy	0.9	1	0.9	0.9	3.36	3.64	3.64	6.15	5.36	38.72	54	84	105
do. do.	f.t.	f.t.	f.t.	f.t.	f.t.	f.t.	f.t.	f.t.	f.t.	f.t.	f.t.	f.t.	f.t.
Rounds per minute	0.28	0.31	0.28	0.28	1.04	1.125	1.125	1.9	1.66	11.98	17	26	32
Weight of Mounting	650-750	900-1000	500-600	900-1000	450-650	450-650	450-650	350-450	400-450	100	200	200	130-140
do. do.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.
Angle of Elevation	..	..	2.3	90°	..	..	..	..	..	46	760	..	965
do. do.	..	..	..	90°	..	..	..	..	..	102	85°	..	90°
Angle of Depression	..	..	90°	90°	..	..	..	..	..	40°	5°	..	5°

* This gun can be adapted to fire any pattern of rifle calibre cartridge.

BEARDMORE GUNS AND HOWITZERS.

NAVAL.

Calibre	4	4-7	4-7	4-7	4-7	5-5	5-5	5-5	6-0	6-0	7-5	8	8	9-2	12	13-5	15	16
do.	ins.	120	120	120	120	140	140	140	152	152	190	203-2	203-2	234	305	343	381	406
Length of Bore	mm.	55	55	55	55	55	55	55	50	50	45	50	55	50	50	46	45	45
Weight of Gun	tons	2-15	3-35	3-85	3-85	8-0	6-8	5-85	7-95	8-1	13-9	17-5	19-25	29	66	77	96	107
Weight of Projectile	lbs.	2,184	3,405	3,405	3,405	8,128	6,910	5,635	8,077	8,230	14,122	17,780	18,542	24,402	67,056	78,232	97,536	108,712
do.	kg.	31	50	50	50	42	82	73	100	100	90	250	250	425	930	1,350	1,850	2,100
Muzzle Velocity	ft.s.	14-06	22-68	22-68	22-68	30,000	30,000	30,000	45-36	45-36	90-72	114-2	114-2	125-8	430-9	612-4	839-2	952-5
do.	m.s.	890	914	900	914-4	900	914-4	808	905-2	914-4	838	2,900	3,000	2,825	2,825	2,650	2,620	2,675
Muzzle Energy	f.t.	1,833	3,017	2,434	3,026	5,587	5,117	3,632	6,116	6,240	10,458	14,579	15,602	23,518	52,571	63,738	88,056	104,198
do.	m.t.	508	934	837	937	1,730	1,584	1,131	1,894	1,938	3,248	4,515	4,832	7,283	16,280	20,441	27,270	32,270

ANTI-AIRCRAFT.				TANK GUNS.			
Motor Boats or Sub-marines.		For Sub-marines.		Mobile.		TANK GUNS.	
Calibre	3-0	4-0	4-0	Fixed.	Fixed.	3-02	1-85
do.	ins.	75	101-6	101-6	4-0	77	47
Length of Bore	mm.	45	40	50	101-6	84	57
Weight of Gun	tons	0-67	1-3	2-1	45	42-5	23
do.	kg.	686	1,321	2,133	1,951	1-1	5-6 cwt.
Weight of Projectile	lbs.	12-5	31	31	1,675	762	284
do.	kg.	5-67	14-06	14-06	726	21	6
Muzzle Velocity	ft.s.	2,200	2,250	2,850	792	8-0	2-72
do.	m.s.	470	685-8	869	792	1-49	1-525
Muzzle Energy	f.t.	419	1,888	1,740	744	701	465
do.	m.t.	130	337	530	230	238	96-7
				Semi-Auto.			
				Fixed.	Fixed.	179	21-6
				4-0	4-0	179	21-6
				101-6	101-6	179	21-6
				45	45	179	21-6
				1-65	1-65	179	21-6
				1,675	1,675	179	21-6
				726	726	179	21-6
				2,200	2,200	179	21-6
				470	470	179	21-6
				1,888	1,888	179	21-6
				337	337	179	21-6

ANTI-TANK.				FIELD GUNS AND HOWITZERS.			
Infantry Guns.		Gun.		How.		Gun.	
Calibre	1-85	1-575	2-24	3-3	4-5	6	8
do.	ins.	40	57	84	112	152-4	203-2
Length of Bore	mm.	28-5	37	105	132	152-4	17
Weight of Gun	tons	1-03	1-03	1-03	1-15	3-0	3-0
Weight of Projectile	kg.	52-4	46-7	46-7	45-8	45-36	45-36
do.	lbs.	3-25	2-0	3-25	100	2,375	2,375
Muzzle Velocity	ft.s.	1,550	2,000	1,550	1,100	3,911	3,911
do.	m.s.	473	609-6	473	335-3	3,911	3,911
Muzzle Energy	f.t.	54	55	444	293-6	1,083	1,083
do.	m.t.	16-7	17	138	90-9	335	335
				S.A.			
				3-3	4-5	6	8
				84	112	152-4	203-2
				105	132	152-4	17
				20	30	3-0	3-0
				46-7	45-8	45-36	45-36
				369	1,100	2,375	2,375
				18-5	1,100	3,911	3,911
				35-2	335-3	1,083	1,083
				100	293-6	335	335
				1,550	444	1,083	1,083
				473	138	335	335
				17	138	335	335
				S.A.	S.A.	S.A.	S.A.

In same carriage.

In same carriage.

BRAZIL NAVAL ORDNANCE.

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Calibre in Centimetres. Length in Calibres.	Model and Maker.	Year of Construc- tion.	Weight of gun in kilograms.	Projectile.		Carried by.
				Weight of Projectile in kilograms.	Velocity in metres per second.	
305 m/m. 45 . .	Model I, Armstrong	1908	61-947	385,500	853	M. Geraes and S. Paulo.
152 m/m. 50 . .	Model I, "	1897	7,722	45,300	793	Pernahyba.
120 m/m. 49 . .	Model II, "	1898	2,794	20,400	793	Pernambuco and Belmonte.
120 m/m. 50 . .	Model III, "	1908	3,369	20,400	915	Minas, S. Paulo, Bahia and Rio Grande do Sul.
120 m/m. 41 . .	Model Ansaldo	—	—	22,876	—	Humayta.
101.6 m/m. 40 . .	Model I, Armstrong	—	—	12,500	—	Ceará
101.6 m/m. 40 . .	Model II, "	1908	1,321	14,000	701	Piauhý, R. G. Norte, Parahyba, Alagoas, Sergipe, S. Catharina, Matto-Grosso, Carioca and Camocim.
101.6 m/m. 40 . .	Model III, Armstrong	1922	1,339	14,000	701	Maranhão.
101.6 m/m. . .	Model, N. Vickers-Armstrong	1934	—	14,061	853	Almirante Saldanha.
100 m/m. . .	Model Ansaldo	—	—	—	—	Tupy, Tamoyo and Timbira.
87 m/m. 8 . .	Armstrong	1898	108	6,800	254	Pernahyba and Paraguassú.
76 m/m. 50 . .	Model I, Bethlehem	1918	—	7,700	823	Minas and São Paulo.
76.2 m/m. A.A. .	Vickers-Armstrong, Model I	1934	—	6,500	780	Almirante Saldanha.
76.2 m/m. T.R.S.A. .	Model I, Hotchkiss	1934	—	5,56	620	Almirante Saldanha.
57 m/m. 40 . .	"	1898	365	2,720	650	Mario Alves and Lahmeyer.
57 m/m. 42 . .	"	—	317.5	2,700	701	Amapa.
47 m/m. 40 . .	"	1898	220	1,500	720	Pernambuco, Jacuquay, Rio Branco, Oyapock, Perdigão, Muniz Freire, D.N.O.G. and Anibal de Mendonça.
46 m/m. 50 S.A. .	Model I, Armstrong	1908	259	1,500	701	Piauhý, R. G. Norte, Parahyba, Ala- goas, Sergipe, S. Catharina and Matto-Grosso.
47 m/m. 50 S.A. .	Model II, Armstrong	1908	371	1,500	817	Minas and São Paulo.
47 m/m. 46 S.A. .	Model III	1908	371	1,500	817	Bahia, R. G. Sul, Maranhão, Vital de Oliveira, José Bonifacio and Parna- hyba.
47 m/m. 45 . .	Model I, Nordenfeldt	1898	233.4	1,497	585	Ceará.
38 m/m. 41 . .	"	1898	—	0.810	—	Oyapock, Parahyba and Paraguassú. Itacurussá, Itajahy, Iguape and Itapemirim.
40 m/m. 42 . .	Model I, Hotchkiss	1898	120	0.850	600	Pernambuco and Oyapock. Used at shore establishments.
37 m/m. 30 . .	" M. Nordenfeldt	1898	189	0.453	549	Oyapock, Pernambuco and Volun- tario.

This Table has been supplied through the courtesy of Captain Natal Arnaud, in London.

FRENCH NAVAL ORDNANCE.

Calibres (mm.) . . .	340	330	305	203	155	152	138			130			100	90	75	37
Model	1912	1931	1906-10	1924	1920	1930	1929	1923	1910	1924	1919		1917	1926	1924	1925
Length (in calibres) . .	45	—	45	50	50	55	50	40	55	40	40		45	50	50	50
Weight of gun (Kgs.) .	66,950	—	54,020	20,716	8,870	7,840	4,300	4,113	5,300	3,875	4,392		1,565	1,600	1,070	158
Weight of projectile . .	576	—	432	123	56.5	54	40	40	36	32	32		14	9.5	6	0.75
Weight of charge (Kgs.)	153	—	126	47	19.6	17	12	9	10.5	8	8		4	3	2	0.25
Pressure (kg/cm ²) . .	2,600	—	2,400	2,750	3,050	3,200	2,500	2,500	2,500	2,420	2,420		2,400	2,500	2,560	2,400
Muzzle velocity (m/sec.).	794	—	783	850	850	870	800	700	830	734	734		720	850	850	800

GERMAN NAVAL ORDNANCE.

Calibre.	Usual Naval Designation.	Length in Cals.	Date of Model.	Weight of Gun.	Weight of A.P. Shot.	Initial Velocity.	Maximum penetration direct impact against K.C. at			Danger space against average ships at			Approximate Muzzle Energy.
							9,000 yards.	6,000 yards.	3,000 yards.	10,000	5,000	3,000	
inch 11	c/m 28	..	'28	tons ..	lbs. 670	foot-secs. ..	inches ..	inches ..	inches ..	yards ..	yards ..	yards ..	foot-tons ..
11	28	40	'01	32.2	661.4	2756	6	10	14	150	450	740	31,600
8	20.3	..	..	..	..	..	..	..	..	..	..	..	..
5.9	15	50	..	5.5	101.4	3084	..	..	..	..	..	..	6,690
5.9	15	45	'09	5		2920	..	..	5	..	200	420	5,990
5	12.7	..	..	..	..	..	..	..	..	..	..	..	..
4.1	10.5	45	'16	..	38.2	..	..	..	..	..	..	..	..

Brass cartridge cases to all guns.

15 inch in new 35,000 ton battleships.

Lesser guns : 3.4 inch (88 m/m) firing 22 lb. projectiles in modern and 15 lb. in old models.

A.A. guns : 4.1 inch, 3.5 inch on H.A. mounts ('Flak').

Projectiles : Guns of 11 inch and over fire A.P., Ersatz A.P., H.E., and common shell.

The 1899 and later models have the recoil utilized to return the gun to firing position for pieces over 6 inch. In 6 in., springs are employed.

German guns have a lower muzzle pressure than normally obtains.

11 inch, 40 cal., M. '01 in Schlesien and Schleswig Holstein classes.

ITALIAN NAVAL ORDNNANCE.

Official Designation :— Calibre mm., length cal. Mark A. = Armstrong, V = Vickers, An. = Ansaldo, S. = Schneider, Mark O.T.O. = Odero-Terni- Orlando Date of introduction.	305/46	254/45	254/45	203/53	203/50	190/45	152/53	152/50	152/45	120/50	120/45	102/45	100/47	102/35	76/50	76/45	76/40	76/17
	A., V.	A.	V.	An.	S.-An.	A., V.	An.	A.	S.	An. 1926 O.T.O.	A. 1918 O.T.O.	S. A.	O.T.O.	S.	A., V.	S.	A.	S.
	1909	1907	1906	1929	1924	1906	1927-29	1918	1911	1931	1909	1917	1929	1914- 1915	1909	1911	1916	1912
Designation by calibre, cm.	30-479	25-4	25-4	20-3	20-3	19-05	15-24	15-24	15-24	12-0	12-0	10-2	10-0	10-2	7-62	7-62	7-62	7-62
Calibre in inches	12	10	10	8	8	7-5	6	6	6	4-75	4-75	4	3-9	4	3	3	3	3
Total, in feet	47-77	39-07	38-715	36-646	34-593	29-22	27-83	25-94	23-42	19-57	20-38	15-715	15-721	12-247	13-271	11-722	10-292	4-593
Rifled Bore, in inches	477-9	358-4	370-5	358-66	—	281-7	—	256-6	219-2	—	204-64	150-74	12-365	114-29	126	107-2	101-57	44-8
Powder Chamber in inches	97-7	74-91	74-91	64-56	—	51-65	—	44-6	44-6	—	28-64	35-03	3-112	23-50	22	25-4	—	—
Bore in calibres	37-3	35-84	37-05	37-05	—	37-5	—	42-77	36-54	—	43-31	36-96	37-53	28-46	42	35-73	28-42	14-96
No. of Grooves	72	60	70	52	52	44	44	36	56	36	36	40	26	32	28	25-8	16	24
Twist of Rifling, in calibres	30	30	30	30	30	00-30	30	33	36	30	30	30	30	—	30	35-9	33	22
Total Weight in tons	62-99	34-49	35-339	19-170	20-800	14-478	7-700	8-100	7-025	3-00	3-662	2-327	2-020	1-200	1-122	0-698	0-660	0-104
Armour-piercing pro- jectile	346	185	185	111-994	103-19	70-987	43	—	—	—	—	—	—	—	—	—	—	—
Common Shell, H.E., lb.	279-9	185	185	—	—	70-987	—	32-79	30-64	—	14-66	9-589	9-479	6-50	3-02	3-571	2-281	0-529
Armour-piercing projec- tile	997-2	494	494	275-573	260	200-39	103-5	—	—	50-5	48-74	30-31	30-318	—	—	—	—	—
Shell, H.E., lb.	884-4	489-8	489-8	—	—	498-5	—	110-22	103-61	—	48-74	48-74	—	30-31	14-05	14-05	13-954	11-68
Shrapnel, lb.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Armour-piercing pro- jectile	16-63	4-37	4-37	—	—	2-332	—	—	—	—	—	—	—	—	—	—	—	—
Shell, H.E., lb.	53-13	29-86	29-86	—	—	11-706	—	5-996	7-528	—	2-711	2-711	—	—	1-102	1-102	—	0-782
Shrapnel, lb.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0-165
Bursting Velocity in ft. secs.	2755-9	2788-77	2788-77	3051-180	2743-20	2788-77	2786	2854	2723	2786	2460	2788	2438-40	2460	2460	2460	2214	1230
Muzzle Velocity in ft. secs.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Muzzle Total tons per sq. inch	18-63	17-71	17-71	—	—	17-98	—	18-37	16-86	—	18-37	15-75	18-37	18-37	18-37	15-75	—	12-47

Calibre 381 for battleships "Littorio" and "Vittorio Veneto," and calibre 320 for battleships "Cavour" and "Cesare"; 305/46 A.V., "Duilio" and "Doria" class; 254/45 A., "S. Giorgio" class; 254/45 V., "Pisa"; 203/53 An., 1929, "Zara" class; 203/50 S.An., "Trento" class; 190/45 A.V., "S. Giorgio" and "Pisa" class; 152/53 An., O.T.O., "Colleoni" class; 152/45 S., "Duilio" class; 120/50 An., "Vivaldi" class; 120/50 A.V., "Quarto" and "Cesare"; 120/45 A., "Leone"; 100/47 O.T.O., "Trento," "Zara" and "Colleoni" class.

JAPANESE NAVAL ORDNANCE

Date and Pattern of Gun.	KM. (1)	V. (2)	A. (3)	V. (4)	A. (5)	A. (6)	V. (7)	— (8)	A. (9)	Carried by
Desig. by Calibre, in cms.	40·6	35·6	20·3	15·2	15·2	15·2	15·2	14	12	(1) Mutu Class.
Calibre, in inches	16	14	8	6	6	6	6	5·5	4·7	(2) Ise Class. Husō Class. Kongō Class.
Total length, in feet . . . . .	..	..	..	..	..	..	..	..	..	(4) Kongō.
Length of Bore, in ins. . . . .	..	..	..	..	..	..	..	..	..	(5) Husō Class. Kongō Class (ex- cept Kongō). Yahagi.
Length of Bore, in cala.	45	45	45	50	50	45	45	50	45	(8) Ise Class. Mutu Class. Kuma Class. Tenryū Class.
Total weight, in tons. . . . .	..	83	17·3	8	8·7	8·5	7·5	6·25	3·3	(9) Yodo.
Weight of Firing Charge, Armour-piercing Projectile lb.	..	..	..	..	..	..	..	..	..
Weight { Armour-piercing Projectile . lb. (Common Shell)	2190	1400	250	100	100	100	100	82	45	
Muzzle Velocity, in f.s., A.P. Projectile .	2780	2526	2740	3000	3000	2180	3000	2725	2988	
Muzzle Energy in foot-tons	118,000	62,500	13,100	6300	6300	3165	6300	4250	2810	
Perforation at Muzzle, † wrought iron, inches	65 (13·8 at 10,970 metres)	49·2	30·5	25·5	25·5	18·3	25·5	20·8	19·2	
Perforation Krupp Steel, 3000 yds. . . . .	..	..	10½	6½	6½	4½	6½	..	2½	

† By Trevellick's Formula.

NETHERLANDS NAVAL ORDNANCE.

Pattern of Gun :—K. = Krupp ; B. = A. B. Bofors ; V. = Vickers ; H.I.H. = Holl. Industrie Handel Mij.

	K.	K.	K.	B.	H.I.H.	B.	H.I.H.	B.	H.I.H.	K.	B.	H.I.H.	K.	K.	K.	V.	B.
																2 pdr.	2 pdr. double
Diameter of Bore mm.	280	240	150	150	150	150	150	120	120	105	88	75	75	75	50	40	40
Length of Barrel cal.	40	40	50	50	50	50	50	50	50	50	45	55	55	55	40	40	60
Weight of Gun kg.	31,000	24,500	7,240	7,250	7,420	7,500	4,060	4,265	2,475	1,475	1,665	1,365	1,665	1,470	245	280	320
Weight of Projectile kg.	270	172.85	46	46	46.25	46.25	24	24	18	18	10	10	5.90	5.90	1.75	0.906	0.955
Muzzle Velocity m/sec.	800	814	900	900	900	900	900	900	883	800	800	895	895	895	680	600	900
Range max. . . m.	16,100	17,200	22,000	22,000	22,000	22,000	16,000	16,000	12,000	11,400	11,400	10,500	10,500	10,500	6,000	5,000	8,500
Rounds per Minute .	3	4	10	10	10	20	15	15	15	15	20	28	28	28	25	30	240
Weight of Gun, Mounting and Shield kg.	197,424	125,700	19,525	20,500	20,790	72,000	8,610	9,770	8,245	4,603	3,411	4,700	4,700	4,695	1,128	948	3,500
Weight of Shield kg.	—	—	5,270	6,100	6,400	24,200	310	310	2,770	—	—	—	—	—	—	—	—
Angle of Elevation degr.	15	20	25	29	30	60	30	35	20	70	35	95	90	80	20	15	90
Angle of Depression degr.	4	4	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10

NORWEGIAN NAVAL ORDNANCE.

THE COAST ARTILLERY.

Official designation:— Calibre mm., length cal.	305	280	280	240	210	210	150	150	150	120	40
Mark A. = Armstrong, B. = Bofors, Kr. = Krupp, Wh. = Whitworth, St. Ch. = St. Chamond	H* 30 B.	K† 40 Kr.	H* 14 Wh.	H* 13, 16 St. Ch.	K† 45 A.	K† 45 St. Ch.	K† 50 A.	K† 50 B.	K† 47.5 A.	K† 48.9 A.	Aut. gun 60 B.
Design. by calibre in cm. . . .	30.5	28	28	24	20.93	20.93	14.91	14.92	14.91	12	4
Calibre in inches	12	11.02	11.02	9.45	8.24	8.24	5.87	5.87	5.87	4.72	1.57
Length { Total in mm. . . .	9,150	11,200	4,090	3,158	9,520	9,520	7,720	7,703	7,082	5,400	2400
" inches	360.23	440.95	161.02	124.33	374.80	374.80	303.93	303.26	278.81	212.6	94.5
" Rifled bore in mm. . . .	7358.2	8,235	3,192	2719.7	7866.4	7863.1	6547.7	6359.1	5971.5	4552	1936
" inches	289.69	324.21	125.66	107.08	309.7	309.57	257.78	250.36	235.26	179.21	76.2
Capacity of Powder Chamber in dm. ³	30	37	13	12.7	43.8	43.8	50	50	46	43.9	60
Capacity of Powder Chamber cubic inches	85	164.6	26.2	17.8	56.20	56.20	25.4	28.5	18.12	8.47	0.49
No. of grooves	5,187	10044.7	1598.9	1086.3	3429.6	3429.6	1,550	1739.2	1105.8	517	29.9
Twist of rifling in calibres	40-25	45-25	40-15	14-78	0-30	29-89	0-30	45-30	0-30	0-30	45-30
Total weight in tons	132	80.8	39.5	20	64	43.9	—	38.4	19.6	5.6	1.7
Weight of firing charge, kg. . . .	59	62	7.86-7.95	4.75	24.85	24.85	—	15	9.71	4.5	0.29
Weight of projectile, lb. . . .	129.8	136.4	17.3-17.5	10.45	54.67	54.67	—	33	21.36	9.9	0.63
Weight of projectile, kg. . . .	385.6	345-255	345-215	215	140	140	45	45	20.4	20.4	1.0
Muzzle velocity, m./sec. . . .	615	630-706	759-473	473	308	308	99	99	99	99	2.2
Muzzle velocity, feet/sec. . . .	2017.8	2067-2316.4	290-350	285	700	700	900	900	778	783	850
Muzzle in m. tons	7433.5	6979.2-6477.2	952.4-1148.4	935.1	2296.7	2296.7	2961.9	2961.9	2552.6	2569	2788
energy } in m. tons	24389.3	22898.8-21251.7	1478.8-1342.4	890.1	3500	3500	1857.8	1857.8	1388	638	36.8
energy } , foot tons			4851.9-4403	2920.4	11483.5	11483.5	6095.4	6095.4	4554	2093.3	120

* Howitzer.

† K means gun.

NORWEGIAN NAVAL ORDNANCE.

THE NAVY.

Official designation :— Calibre mm., length cal.	210/44	150/46	120/44	120/44	100/40	100/40	100/40	76/50	76/40	76/28	76/28 A.A.	76/21 A.A.	65/43	40/60
Mark A. = Armstrong, B. = Bofors, { N. = Nordenfælt, H. = Hotchkiss }	A.	A.	A. N.	B.	B. I.	B. II.	B.	B.	A.	B.	B.	B.	H. N.	B. Aut. gun.
Design, by calibre in cm.	20.93	14.91	12	12	10.16	10.16	7.6	7.6	7.6	7.6	7.6	7.6	6.5	4
Calibre in inches	8.24	5.87	4.7	4.7	4	4	3	3	3	3	3	3	2.6	1.57
Total in mm.	9,520	7,093	5,400	5,610	4,334	4,334	4,066	3,139.4	3,139.4	2,316	2,316	1,782	3,025	2,400
" in inches	374.8	279.25	212.6	220.9	170.6	170.6	160	123.6	123.6	91.2	91.2	70.2	119.1	94.5
Rifled bore in mm.	7,866	5,949	4,552	4,524	3,397	3,397	3,243.6	2,600	2,600	1,834.1	1,834.1	1,300.1	2,333.5	1,936
" in inches	309.7	234.2	179.2	178.1	133.7	133.7	127.7	102.4	102.4	72.2	72.2	51.2	91.9	76.2
Length														
Powder chamber in mm.	1,234	828	661.6	769	587.2	587.2	518.45	410.7	410.7	251.7	251.7	251.7	421	314
Powder chambers in inches	48.6	32.6	26	30.3	23.1	23.1	20.4	16.2	16.2	9.91	9.91	9.91	16.57	12.3
Bore in calibres	43.8	45.8	44	44.1	40	40	50	40	40	28	28	21	43.4	60
No. of grooves	32	28	26	36	32	32	28	16	16	28	28	28	26	16
Twist of rifling in calibres	0.30	0.30	0.30	25.6	30	30	30	0.30	0.30	27	27	30	0.28	45.30
Total weight in tons	96.5	17.9-12.9	8.36	8	5	5.6	2	3.15-1.43	3.15-1.43	0.974	1.3	0.888	1.63	1.6
Weight of firing charge, kg.	26	10.7	4.5	4.88	3.25	3.25	1.75	1.05	1.05	0.46	0.46	0.46	0.9	0.29
" projectile, lb.	57.3	22.2	9.92	10.76	7.16	7.16	3.85	2.31	2.31	1.01	1.01	1.01	1.98	0.63
" lb.	142	45	20.41	21	14.06	14.06	5.67	5.67	5.67	5.67	5.67	5.67	4.0	1.0
Muzzle velocity, m. sec.	700	800-808	783	800	775	775	860	674	674	500	500	460	725	850
" feet sec.	2,297	2,625-2,651	2,569	2,625	2,543	2,543	2,887	2,211	2,211	1,640	1,640	1,510	2,379	2,788
Muzzle energy { in m. tons	3,500	1,468-1,500	638	685	429	429	214	131	131	72.2	72.2	61.2	107	36.8
" { in foot tons	11,484	4,817-4,992	2,093	2,248	1,408	1,408	702	430	430	237	237	200	351	120

SPANISH NAVAL ORDNANCE.

Calibre.	Length.	Weight of Gun.	Total Weight	Weight of Charge.	Weight of Shell.	Initial Velocity.	Muzzle Energy.
305 mm.	m. 15·659	kgs. 65,046	kgs. 91,131	kgs. 130	kgs. 385·55	m.p.s. 894	Tn. m. 15,984
203·2 "	10·476	15,900	40,250	35·8	116·1	885	4,698
152·4 "	7·867	8,738	21,837	15	45·36	900	1,920
120 "	5·582	3,226	9,639	6·4	22	850	813
120 " (G.A.) . . .	5·691	2,985	10,655	6·1	22	853	818·5
101·6 " 50 C. . . .	5·292	2,120	5,893	5·275	14·06	914	598
101·6 " 45 C. . . .	4·770	1,840	8,657	3·9	14·06	823	485
101·6 " 40 C. . . .	4·231	1,264	4,750	2·5	14·06	701	352
76·2 " 50 C. . . .	3·987	973	2,154	1·6	5·67	823	200
76·2 " 45 C. . . .	3·601	823	2,953	1·5	5·67	792	185

A. B. BOFORS—GUNS AND MOUNTINGS

Tables corrected by the Manufacturers, January, 1938.

NAVAL GUNS AND MOUNTINGS.

System	25 mm.	40 mm.	40 mm.	40 mm.	75 mm.	75 mm.	75 mm.	75 mm.	88 mm.	102 mm.	105 mm.	105 mm.
	double.	Auto.	Auto.	Auto.	double.	Semi-Auto.	Semi-Auto.	Semi-Auto.	Semi-Auto.	Semi-Auto.	Semi-Auto.	double.
Diameter of Bore	25	40	40	40	40	75	75	75	88	102	105	105
Length of Barrel	64	43	60	60	60	40	49	60	45	50	40	50
Weight of Gun	75	165	220	220	220	430	615	1,195	1,665	2,430	1,180	2,550
Projectile	0.250	1.0	1.0	1.0	1.0	6.5	6.5	6.5	10	14	16	16
Muzzle Velocity	850	700	850	850	850	600	750	850	800	850	700	800
Range, max.	5,500	9,980	11,200	11,200	11,200	11,200	14,300	16,000	16,000	18,300	14,600	18,200
Rounds per Minute	180	120	120	240	240	30	28	50	20	15	14	25
Weight of Gun, Mounting, and Shield	570	900	1,600	3,100	1,410	1,775	8,300	3,550	7,590	2,950	22,100	4,500
Angle of Elevation	—	—	—	—	240	40	80	90	40	80	32	85
Depression	10	10	10	10	10	10	5	10	10	10	10	10

NAVAL GUNS AND MOUNTINGS—continued.

	12 cm.	12 cm.	12 cm.	12 cm.	15 cm.	15 cm.	15 cm.	15 cm.	20.3 cm.	25.4 cm.	28 cm.
	double.	double.	double.	double.	double.	double.	double.	double.	double.	double.	double.
Diameter of Bore	120	120	120	120	149.1	149.1	149.1	149.1	203	254	283
Length of Barrel	45	50	50	50	45	50	50	50	50	45	50
Weight of Gun	2,600	4,100	4,100	6,100	7,865	7,865	7,500	22,500	37,900	37,900	50,000
Projectile	21	24	24	46	46	46	46	115	225	225	305
Muzzle Velocity	800	900	900	835	900	900	900	900	850	850	900
Range, max.	19,300	19,500	19,500	19,600	24,500	24,500	24,500	28,000	30,300	30,300	30,000
Rounds per Minute	12	10	18	8	7	15	12	8	8	8	6
Weight of Gun, Mounting, and Shield	8,700	11,000	20,000	17,860	28,300	28,300	72,000	170,000	320,000	320,000	703,600
Angle of Elevation	800	1,500	1,600	4,550	12,000	12,000	24,200	29,000	114,000	114,000	107,000
Depression	45	30	30	30	60	60	60	45	45	45	35
	10	10	10	10	10	10	10	5	10	10	8

A.B. BOFORS—GUNS AND MOUNTINGS. *Howitzers and Field Guns.*

	75 mm. light Field Gun	75 mm. Field.	75 mm. Field.	10.5 cm. Field Howr.	10.5 cm. Field.	10.5 cm. Field. Howr.	15 cm. Field Howr.	15 cm. Field.	21 cm. Field Howr.
Diameter of Bore	75	75	75	105	105	105	149.1	149.1	216
Length of Barrel	24	40	46	24	46	22	24	43	14
Weight of Gun	265	365	400	495	1,200	1,380	1,470	5,250	2,780
Weight of Projectile	6.5	6.5	6.5	14	15.3	16.5	41	46	100
Muzzle Velocity	500	625	710	525	785	800	475	825	475
Range, max.	10,200	12,500	14,000	11,000	17,000	18,200	12,000	22,500	13,000
Rounds per Minute	25	25	25	12	10	8	6	—	3
Weight of Gun, Mounting and Shield	920	1,350	1,550	1,750	3,750	4,200	4,300	12,000	7,800
Angle of Elevation	50	45	45	45	45	45	45	45	70
Depression	10	5	5	5	3	3	3	0	6

	Tank Guns.		Infantry Guns.				Mountain Howitzers.	
	37 mm.	47 mm.	37-81 mm.		47-75 mm.		75 mm.	105 mm.
			37 mm. Barrel.	81 mm. Barrel.	47 mm. Barrel.	75 mm. Barrel.	37 mm.	47 mm.
Diameter of Bore	37	47	37	81	47	75	37	77
Length of Barrel	45	33	45	20	33	20	45	70
Weight of Gun	105	105	144	144	130	130	103	196
Weight of Projectile	0.7	1.5	0.7	4.4	1.5	4.5	0.7	1.65
Muzzle Velocity	800	560	800	320	560	300	800	700
Range, max.	6,400	5,400	7,100	6,000	6,500	5,400	6,400	6,000
Rounds per Minute	30	30	25	20	25	20	30	25
Weight of Gun, Mounting and Shield	300	300	450	450	425	425	335	750
Angle of Elevation	25	25	80	80	60	60	25	18
Depression	10	10	8	8	5	5	10	10

A.B. BOFORS—GUNS AND MOUNTINGS. *Anti-Aircraft Guns.*

	25 mm. Fixed.	25 mm. Mobile.	40 mm. Fixed.	40 mm. Mobile.	75 mm. Mobile.	75 mm. Mobile.	75 mm. Fixed.	80 mm. Mobile.	102 mm. Fixed.	105 mm. Mobile.
System	Auto.	Auto.	Auto.	Auto.	Semi- Auto.	Semi- Auto.	Semi- Auto.	Semi- Auto.	Semi- Auto.	Semi- Auto.
Diameter of Bore mm.	25	25	40	40	75	75	75	80	102	105
Length of Barrel cal.	64	64	60	60	50	60	60	50	50	50
Weight of Projectile kg.	0.250	0.280	1.0	1.0	6.5	6.5	6.5	8	14	16
Muzzle Velocity m.s.	850	900	850	850	750	840	870	750	850	800
Rounds per Minute	180	200	120	120	30	25	25	25	15	12
Weight of Gun and Mount- ing kg.	500	1100	2,000	2,000	2,600	5,000	3,400	4,000	7,000	10,000
Angle of Elevation deg.	90	90	90	90	85	85	85	85	85	85
„ Depression deg.	10	5	10	5	3	5	5	3	5	0

UNITED STATES NAVAL ORDNANCE.

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GUN.	MARK.	Length in Calibres.	Total Length. Inch.	Capacity of Chamber in Cubic Inches.	Travel of Projectile in Inches.	Weight of Gun. tons.	Weight of Projectile. lb.	Weight of Charge. lb.	Muscle Velocity. ft.-seconds.	Muscle Energy. ft.-tons.	Penetration at Armour, using Muzzle, Krupp Capped Projectile. inch.
3-in. S.A.	V, VI.	50	159	219	128.8	1.0	13	3.85	2700	658	3.8
4-in. R.F.G.	III, IV, V, VI.	40	164	381	134.5	1.5	33	4.85	2000	915	3.4
4-in. R.F.G.	VII.	50	205	652	168.3	2.6	33	9.0	2500	1,480	4.6
4-in. R.F.G.	VIII†	50	205	652	168.3	2.9	33	12.3	2800	1,794	5.8
5-in. R.F.G.	II, III, IV.	40	206	656	167.8	3.1	50	10.0	2300	1,845	5.3
5-in. R.L.R.	V, VI.	50	256	1,200	215.6	4.6	60	19.2	2700	3,032	6.2
5-in. R.L.R.	VI.	50	256	1,200	215.6	4.6	50	20.5	3000	3,122	6.4
5-in. R.F.G.	VII†	51	261	1,135	215.6	5.0	50	23.8	3150	3,439	6.8
6-in. R.F.G.	II, III.	30	196	1,318	145.4	4.8	105	18.8	1950	2,768	5.3
6-in. R.F.G.	IV, VII.	40	256	1,320	205.8	6.0	105	18.8	2150	3,365	6.0
6-in. R.F.G.	IX.	45	270	1,320	221.7	7.0	105	18.8	2250	3,685	6.3
6-in. R.L.R.	VI.	50	300	2,101	247.5	8.3	105	30.0	2600	4,920	8.0
6-in. R.L.R.	VIII.	50	300	2,101	247.5	8.6	105	37.0	2800	5,707	8.3
7-in. B.L.R.	II.	45	323	3,643	259.8	12.7	165	58.0	2700	8,898	9.6
8-in. B.L.R.	III, IV.	35	305	3,170	245.8	13.1	260	43.8	2100	7,948	8.6
8-in. B.L.R.	V.	40	343	5,243	273.1	18.1	260	78.0	2500	11,264	10.6
8-in. B.L.R.	VI.	45	369	5,243	299.1	18.7	260	98.5	2750	13,360	12.0
10-in. B.L.R.	L, II.	30	329	6,779	251.1	25.1	510	90.0	2000	14,141	10.7
10-in. B.L.R.	III.	40	413	10,222	327.0	34.6	510	207.5	2700	25,772	15.6
12-in. B.L.R.	L, II.	35	441	11,991	345.2	45.3	870	160.0	2100	26,596	14.2
12-in. B.L.R.	III, IV.	40	493	17,096	392.2	52.1	870	237.5	2400	34,738	16.8
12-in. B.L.R.	III, IV.	40	493	17,096	392.2	52.1	870	305.0	2600	40,768	18.5
12-in. B.L.R.	V.	45	553	16,974	452.0	52.9	870	305.0	2700	43,964	19.4
12-in. B.L.R.	VI.	45	553	14,970	452.0	53.6	870	340.0	2850	48,984	20.8
12-in. B.L.R.	VII.	50	607	14,296	506.8	56.1	870	340.0	2950	52,483	21.7
13-in. B.L.R.	L, II.	35	479	15,068	374.9	61.4	1130	180.0	2000	31,333	15.0
14-in. B.L.R.	I.	45	642	..	..	63.6	1400	365.0	2600	65,606	39.7*
14-in. B.L.R.	II.	50	700	..	..	82.2	1400	..	2800	76,180	44.1
16-in. B.L.R.	..	45	..	..	..	105.0	2100	..	2006	98,500	45.95
16-in. B.L.R.	..	50	..	..	..	130.0	2100	..	2800	114,270	51.08

* De Merre formula.

† All battleships from the Delaware class onward have this gun for torpedo defence.

‡ There is now a 4-in. 50-cal. anti-aircraft gun.

The U.S. Navy has a 5-in. 25-calibre A.A. gun ; a 6-in. 53-calibre gun ; and an 8-in. 55-calibre gun, but complete details are not yet published.

MISCELLANEOUS

STATEMENT RELATING TO DEFENCE.

(Cmd. 5944.)

I.

INTRODUCTORY.

IN each of the last four years a Statement on Defence has been presented to Parliament about the time of the publication of the Defence Estimates, dealing with some aspect of His Majesty's Government's general policy in Defence matters. Thus, the Statement of 1936 * explained in outline the plan which had been drawn up for the reconditioning and modernisation of our Defence forces ; while the Statement of 1937,† which coincided with the introduction of the Defence Loans Bill, 1937, dealt mainly with the extent of the programme and the order of magnitude of the expenditure involved.

2. The present Statement is likewise presented to Parliament at the same time as the introduction of a Defence Loans Bill. It is appropriate, therefore, that this Statement should deal with the cost of the Defence programmes, and should at the same time give such general indication of the progress of the programme as is possible without detriment to the public interest. Fuller particulars on some of the subjects dealt with in this paper will be given later in the Memoranda accompanying the Estimates of the Defence Departments.

3. Two years ago, when the Defence Loans Bill, 1937, was introduced, His Majesty's Government informed Parliament that, in their view, while Defence expenditure during the ensuing years could not equitably be met entirely from revenue, neither the total amount which must be raised from capital, nor the total period over which such capital expenditure must be spread, could then be predicted. Since, however, constitutional usage required that the Defence Loans Bill should specify upward limits, which could not be exceeded except by further statutory authority, His Majesty's Government sought authority for the issue of sums not exceeding in the aggregate £400 millions, to be applied as appropriations in aid of the moneys provided by Parliament for the Defence Services over the five years the 1st April, 1937, to the 31st March, 1942. The figure of £400 millions represented the maximum aggregate sum which could be provided from borrowed moneys or from the Old Sinking Fund towards the total cost of Defence without a further authority from Parliament. If events showed that amendment was

* Cmd. 5107.

† Cmd. 5374.

called for, either in the maximum amount or in the period of years specified in the Resolution presented with the Bill, the necessary measures would be submitted to Parliament.

4. In the concluding section of the Statement of February, 1937, it was stated that, taking the programme as it then stood, it would be imprudent to contemplate a total expenditure on Defence during the five years April, 1937, to March, 1942, of much less than £1,500 millions. A year later, in the Statement of March, 1938,* it was stated that it must be expected that the total expenditure on Defence in this period would exceed this sum.

5. For some time past it has been evident that the borrowing powers conferred by the Defence Loans Act, 1937, would not suffice to meet the total cost of the programme, in so far as it could not be met from revenue. On the 29th November last the Chancellor of the Exchequer stated in reply to a question in the House of Commons that it was his intention at the appropriate time in the ensuing year to ask Parliament to pass legislation to give further borrowing powers.

6. His Majesty's Government are of opinion that it is necessary that these increased borrowing powers should be obtained forthwith, and they are accordingly asking Parliament to authorise the issue of a further £400 millions (making in all £800 millions) to be provided from borrowed moneys or from the Old Sinking Fund, towards the total cost of Defence programmes authorised by Parliament during the five years the 1st April, 1937, to the 31st March, 1942. The authority of Parliament is also asked to extend the scope of the services to which borrowed moneys may be appropriated in aid, so as to include Civil Defence. The reasons for this step are explained in paragraph 10.

II.

COST OF THE DEFENCE PROGRAMMES.

7. In connection with the increased borrowing powers now asked for, it is the duty of His Majesty's Government to give Parliament information as to the extent to which the existing borrowing powers have been exhausted, and the best estimate which can be formed of the probable total of Defence expenditure over the five years to March, 1942.

8. The expenditure of the three Defence Departments for 1937 was approximately £262 millions. In the current financial year (1938) the corresponding total (including projected Supplementary Estimates) is about £388 millions.

In the financial year which starts on the 1st April, 1939, the Estimates for the three Defence Departments, which will be published in the course of the next fortnight, will be some £523 millions.

9. The total expenditure on Defence in the first three years of the quinquennium thus amounts to over £1,173 millions.

The figures in the preceding paragraph relate only to the expenditure of the three Defence Departments (including the Royal Ordnance

* Cmd. 5682.

Factories Vote). It is, however, also necessary to take into account expenditure which is in essence for Defence purposes, but which is borne on the votes for Civil Departments.

10. The expenditure on Air Raid Precautions amounted to £3½ millions in 1937. For the year 1938–39 it is estimated to reach £9½ millions (including a Supplementary Estimate in prospect), while for the year 1939–40 the estimate is £42 millions (exclusive of assistance to vital public utility services and water for emergency fire-fighting purposes, estimated at £9 millions). Expenditure on storage of food, fertilisers and petroleum amounting to £8½ millions was incurred in 1938, and the Estimates for 1939 make provision for £5 millions. Having regard to the magnitude of the sums involved, and also to the fact that much of the expenditure under these heads can be regarded as of a capital nature, His Majesty's Government have (as already stated) reached the conclusion that it is desirable that the scope of the services to which borrowed moneys may be appropriated in aid should be extended to include Civil Defence requirements, such as Air Raid Precautionary services, Emergency Hospital organisation and Food Reserves.

11. Of the borrowing powers conferred by the Defence Loans Act, 1937, approximately £65 millions were used in 1937, and it is estimated that approximately £132 millions will be used in the current year. Thus, of the original borrowing powers conferred, £197 millions have been used and £203 millions remain.

12. The total Defence expenditure in 1939, including expenditure on Civil Defence, will be in the neighbourhood of £580 millions. That figure exceeds the current year's expenditure, after taking into account Supplementary Estimates, by some £175 millions, and exceeds the portion of the current year's Defence expenditure to be met from revenue by some £307 millions. It is clear that the available revenue and the unexhausted borrowing powers conferred by the Act of 1937 will not meet the total Defence expenditure to be incurred in 1939, and that it will be necessary to make some use in 1939 of the increased borrowing powers now asked for.

13. The position in regard to the probable rate of expenditure in the two remaining years of the quinquennium is alluded to in the concluding section of this paper. In brief, the position may be summarised as follows.

14. The earlier stages of the programme have now been completed. Industrial capacity has been largely increased, new models have been designed and tried out, and are in production. The initial difficulties met with in any large programme of production have been largely overcome. All three Service Departments are now receiving armament stores of all kinds and of the latest models, in very large quantities, and production will continue on an increasing scale. The extent of the programmes and the expenditure thereon in the ensuing years of the re-armament programme must, however, be determined by our own Defence needs, judged in the light of the world situation. While, therefore, the measures of acceleration which have been undertaken have contributed to the extent of the Defence expenditure to be incurred in the ensuing financial year, it

is at present impossible to predict how soon the needs of the situation will permit of a slowing down of the production of armaments.

15. It should be added that, while the programmes have been planned with a view to securing an adequate supply of armaments required for our own defensive needs, suitable arrangements have been made to secure that the programme could be effectively adjusted in the light of any improvement in the international situation, with due regard to the interests of the Exchequer.

III.

MAIN REASONS FOR THE INCREASE IN THE COST OF THE PROGRAMMES.

16. It is clear, from what has been said above, that the aggregate expenditure on the Defence programmes over the five years from the 1st April, 1937, to the 31st March, 1942, will be substantially in excess of the estimate of £1,500 millions, given under all reserve, in the Statement of two years ago. It is appropriate, therefore, to preface the fuller particulars given later, with some indication of the main factors responsible for this increase.

17. One factor which has led to increased expenditure is the ever-increasing complexity of modern armaments, to which attention has been drawn in earlier Statements. The ingenuity of the inventor is for ever resulting in new devices and improvements which, while they add to the effectiveness of the weapons in question, also add appreciably to the cost. Every effort is, however, being made to ensure that designs are, so far as possible, simplified and rendered suitable for large-scale production.

18. The main reason, however, for the substantial increase in expenditure on the programme lies in the extent to which it has been necessary to enlarge the original programme, in order to make adequate provision for defence against the contingency of air attack.

19. The Air Estimates for 1939 exceed £200 millions. The heavy rate of expenditure on the Royal Air Force is, of course, mainly accounted for by the very large number of modern aircraft now coming into the squadrons, as a result of the increased manufacturing capacity and the improved production arrangements now in operation. It should be added that, notwithstanding the measures which are being taken to reduce the number of types, and to simplify production, the cost of aircraft which embody the latest improvements in design and technique, and give greatly improved performance, is necessarily much heavier.

20. In addition to expenditure on the manufacture of new airframes, engines, equipment and stores of all kinds, heavy capital expenditure is still being incurred on providing additional manufacturing capacity, and on the construction of new stations. The former subject is referred to in paragraph 30. As regards the latter, in the current year a large programme of works services has been undertaken. Work has been started on thirty-seven new stations,

including Operational Stations, Flying Training Schools, Technical and Armament Training Schools and Maintenance Units. At a number of established aerodromes temporary hutments are being replaced by permanent structures so as to give improved accommodation, and enable better use to be made of existing facilities.

21. As an essential counterpart to the increase in the Air Force, our active ground defences against air attack have been substantially increased. Very substantial progress has been made with the original programme of new anti-aircraft guns and searchlights. Meanwhile further orders have been placed, which will have the effect of greatly strengthening our anti-aircraft defences, and steps have been taken to increase the manufacturing capacity for guns. The programme under this head includes a large number of new drill halls and mobilisation and equipment stores, many of which are now completed or approaching completion. The original programme for the balloon barrage has likewise been extended.

22. Civil Defence measures are explained in a later section. As will be seen from the figures given in paragraph 10, these measures involve very substantial expenditure, the chief heads of which are : respirators and protective clothing and equipment for Air Raid Precautions personnel ; fire-fighting appliances, steel shelters and the strengthening of basements ; storage of food and other essential commodities ; and the special measures to be taken by electricity, gas and water undertakings and by the railway companies.

IV.

PROGRESS OF PRODUCTION.

23. *Navy*.—The needs in regard to Naval construction, and the means proposed for meeting them, were fully set out in the Statement relating to Defence presented to Parliament in 1937 (Cmd. 5374).

24. The speed with which the strength of the Royal Navy is now being increased is shown by the following table of tonnage building at successive dates—

January 1, 1935	..	..	..	139,800
January 1, 1936	..	..	..	291,900
January 1, 1937	..	..	..	375,700
January 1, 1938	..	..	..	547,000
January 1, 1939	..	..	..	544,000
March 31, 1939 (expected)	..	..	..	659,500

During the forthcoming financial year some sixty men-of-war are expected to be added to the Fleet, at a total tonnage of about 120,000. In addition, miscellaneous vessels of a tonnage of about 25,000 will be added.

25. A comparison of our present shipbuilding effort with that of the years before the Great War shows that the average annual tonnage of the principal classes of warship, excluding submarines,

completed during the three financial years 1911, 1912, 1913, was 170,000. The corresponding average for the tonnage expected to be completed during the two years 1940 and 1941 is 219,500. In comparing the present rate of shipbuilding with pre-War years, it is, however, necessary to take account of the increased complexity of the modern warship, and of her armament and equipment.

26. Two capital ships were included in the New Construction Programme for 1936, three in 1937 and two in 1938. It is proposed to include another two in the 1939 Programme, so that altogether there will be nine of these vessels under construction. It is also proposed to include in the Naval building programme for 1939 two destroyer flotillas, and twenty fast escort vessels of a new type intended for the protection of shipping against submarine and air attacks. Provision will also be made for the building of another aircraft carrier (making six in all under construction, excluding *Ark Royal* which has now been completed and is in commission), four large 6-in. gun cruisers, and some smaller vessels. The full programme will be published with the Navy Estimates.

27. Modernisation of existing capital ships is proceeding steadily, and three ships are at present in hand for this purpose. Great progress has been made in strengthening the anti-aircraft armaments of other ships of the Fleet.

28. *Army*.—The re-equipment of the Army with up-to-date weapons and the accumulation of the approved scale of war reserves is proceeding rapidly.

Substantial deliveries are now being received and production of many items has reached the stage when completion is in sight. As explained in paragraph 21, provision of additional anti-aircraft equipment has been put in hand. Large extensions of manufacturing capacity have now become effective and further extensions of manufacturing capacity will come into operation this year.

29. Work on the large programme for the construction of new Royal Ordnance Factories (including factories for the manufacture of explosives, and for filling shells and bombs) which was taken in hand at the outset of the programme has been accelerated.

30. *Royal Air Force*.—During the past year various measures have been taken to broaden the basis of production, in order to increase and accelerate the programme, including provision of the necessary reserves. The system of erecting factories at Government expense, to be managed for and on behalf of the Government by business firms with experience of quantity production, has been extended; and similar arrangements have been made for the erection of new factories and extensions to existing factories by firms in the aircraft industry.

31. In the early part of the year a special procedure was adopted in order to expedite the placing of the large orders required for the programme, so as to enable constructors to make their plans and order raw material well in advance. It was also decided that part of the additional volume of orders should be placed with manufacturers having capacity which would be of value in aircraft production, and who controlled large bodies of skilled labour. Accordingly the

aircraft industry was required to sub-contract with such firms a large proportion of the orders received. In addition, the help of large engineering organisations controlling, or in association with, a number of subsidiaries has also been enlisted. The method to be adopted in this latter case is for the principal firm to arrange for the production of airframe components in the various allied factories and to undertake their assembly in a central factory to be erected at Government expense.

32. Steps have also been taken with a view to building up manufacturing capacity in the Dominions. Contracts have already been placed in Canada for large bomber aircraft and fighter aircraft, and a Mission is now in Australia, by invitation of the Commonwealth Government, with a view to concerting action with that Dominion. This Mission will also visit New Zealand. Orders for the supply of general reconnaissance and training aircraft have been placed in the United States of America.

33. In the course of the current financial year the monthly rate of delivery of aircraft to the Royal Air Force has been more than doubled, and will show further substantial increases.

V.

PERSONNEL.

34. Although the Defence Services require, to a greatly increasing degree, men with technical qualifications, which involve a higher standard of training, the inflow of personnel, while maintaining its high standard of quality, has kept pace with the expansion of the Services.

35. The mobilisation of the Fleet, and partial mobilisation of the Air Defence Organisation, in connection with the crisis last September, afforded a practical test of the machinery for calling up the Reserve and Auxiliary personnel of the Services. The test was highly satisfactory, and it is gratifying to be able to record that the personnel concerned responded to the call with great readiness and alacrity. The machinery has been improved as a result of the experience gained.

36. *Navy*.—The lowest total of Naval personnel in recent years was 89,214, in 1932. Since that date the total of Naval personnel has been steadily increased. The following table shows the numbers borne at the end of each financial year, and the increase as compared with the preceding year :—

						<i>Increase.</i>
1933-34	..	..	..	..	90,295	1,081
1934-35	..	..	..	..	91,927	1,632
1935-36	..	..	..	..	97,312	5,385
1936-37	..	..	..	..	101,868	4,556
1937-38	..	..	..	..	111,810	9,942
1938-39 (numbers voted)..	..	..	..	..	119,000*	7,190*

* Now being increased by 2,000 in consequence of Fleet Air Arm expansion.

37. In the six years 1933-38, the personnel of the Fleet will thus have been increased by 32,000, an increase of 36 per cent. The increase contemplated during the financial year 1939, including an increase of 4,000 required in the Fleet Air Arm, is 12,000. It is also anticipated that during next financial year a very considerable expansion will take place in the Naval Reserves, including the creation of new R.N.V.R. Divisions primarily for the purpose of giving training in anti-aircraft work.

38. The number of recruits entered, which in 1931 was just over 3,000, was in 1935 over 8,000 ; in 1936 it was 11,500, and in 1937 it was nearly 16,000. During the first three quarters of 1938 over 11,000 recruits have been raised.

39. *Army*.—During 1938, 37,323 recruits joined the Regular Army. This was 12,753 more than joined in the previous year and constituted a record for post-War normal recruiting. The enlistment and training of boys as artificers, specialists, etc., has been, and is, being largely expanded. A new school has already been established at Jersey and further new schools are in course of preparation at Chatham and Arborfield. It is hoped to have over 4,000 boys under training by the end of the year. A new section E of the Regular Army Reserve has been created to provide a pensioner reserve of warrant and non-commissioned officers whose services can be utilized on mobilization as instructors at training and similar establishments.

40. The number of candidates from all sources—schools, universities, Supplementary Reserve and Territorial Army—for commissions in the Regular Army now greatly exceeds the demand. This is a complete reversal of the situation two years ago, when it was impossible to fill the number of vacancies offered.

41. Better terms for pay and pension have been instituted ; a new class of warrant officers (Class III) has been established. This offers a further opportunity to other ranks to rise to positions of responsibility in command. Warrant officers (Class III) are now commanding sub-units previously commanded by subalterns.

42. 1938 was an exceptionally good recruiting year in the Territorial Army. 77,142 recruits joined, compared with 45,320 in the previous year. This is the largest number of recruits ever entered in a single year. The strength of the Territorial Army is nearer its establishment than at any time in its history. Several divisions (five out of eighteen) are over establishment, and the average for all divisions is over 90 per cent. of establishment. The increase in establishment consequent on the increase in the number of anti-aircraft divisions calls for a continuance of active recruiting for the Territorial Army. In 1939 over 100,000 are estimated to be required to meet the increase in establishment and to replace wastage.

43. *Royal Air Force*.—The number of recruits required for the Air Force during the financial year ending the 31st March, 1939, was by far the largest for any single year since 1918. The programme involved the entry during the year of some 31,000 officers, men and boys, including 1,700 pilots, and present indications are that the actual entry may reach 35,000. An entry of the order of 20,000 will be required for the regular force during 1939, and it is therefore

essential that a steady flow of recruits of the high quality which was attained during 1938 should continue. A scheme for direct recruitment of air observers has been in operation since August 1938, to meet the increased demand for air crews.

44. Training facilities of all kinds have been extended. There are now twelve Service Flying Training Schools and three more will shortly be opened in Scotland, while flying training both for the Royal Air Force and the Royal Air Force Volunteer Reserve is now being carried out at over thirty civil flying schools.

45. At the beginning of the current financial year the Royal Air Force Volunteer Reserve comprised a section for pilots and a section for medical officers. An additional air section for air crews has been formed, together with ground sections, both for officers and men, corresponding to the different branches and trades of the regular Air Force. Over 2,500 volunteer reservists are now being trained as pilots. Recruiting for most of these new sections was opened in connection with the National Service Appeal in January, and a large number of applications have been received. In order to secure the services in emergency of men who already had Air Force experience, a special scheme of entry into Class "E" of the Reserve was introduced in July last for ex-airmen and pensioners of the Royal Air Force.

VI.

ORGANISATION.

46. *Fleet Air Arm*.—The transfer of the administration of the Fleet Air Arm from the Air Ministry to the Admiralty is proceeding. It is anticipated that the aircraft for the Fleet Air Arm, together with the necessary stores and equipment, will be transferred from the control of the Air Ministry to that of the Admiralty early in the new financial year. The Air Ministry will, however, continue for the time being to be responsible for the maintenance and repair of aircraft of the Fleet Air Arm on an agency basis. In accordance with the terms of the decision of His Majesty's Government on the transfer of administrative control to the Admiralty, the Air Ministry will remain responsible for the supply of material for the Fleet Air Arm, as well as for research and development services.

47. To meet the requirements of the expansion programme, substantial orders have been placed for aircraft of the various types for delivery over the next two or three years.

48. Under measures initiated during 1938, additional personnel totalling some 2,000 will have been added to the Fleet Air Arm before the close of the year, and in 1939, as mentioned in paragraph 37, an increase of 4,000 is contemplated.

49. This additional personnel is being found by transfers from the Fleet and from the R.A.F., as well as by new entries from outside sources. For some time to come, however, the Fleet Air Arm must continue, particularly as regards flying personnel and skilled ratings for maintenance duties, to depend largely upon personnel lent from the R.A.F., or trained at R.A.F. establishments.

50. Under the arrangements now being introduced, while the Air Ministry remain responsible for general flying training of the Fleet Air Arm pilots, the Admiralty will shortly assume responsibility for specialised Naval training. For this purpose, for the training of disembarked squadrons, and for the repair and maintenance of aircraft that cannot be undertaken afloat, shore bases are required. Arrangements are being made with the Air Ministry for the Navy to take over certain R.A.F. shore stations early in the forthcoming financial year. These will not, however, be sufficient to meet requirements, and it will be necessary to make up the deficiency both by the construction of new bases and by the use of R.A.F. stations on a shared basis.

51. *Army*.—The comprehensive reorganization of the Regular Army, on the lines described by the Secretary of State for War in his speech introducing the Army Estimates in March last, has proceeded.

52. The number of anti-aircraft divisions of the Territorial Army has been increased from two to five, and the whole organized into an anti-aircraft Command under a Corps Commander. Parallel with this re-organization of the force, a new directorate was established in the War Office under the control of a Deputy Chief of the Imperial General Staff for coast defence and anti-aircraft. In this directorate are centred all questions regarding training and organization of the anti-aircraft and coast defence.

53. The Field Force portion of the Territorial Army has been reorganized to conform with the Regular Army. Not only have all Arms been reorganized but units, which have no counterpart in the Regular Army, such as motor cycle battalions, have been formed. The higher organization has been thoroughly overhauled, and in place of the former twelve divisions, there are now nine infantry divisions, three motor divisions, and mobile brigades which can be organized into a mobile division in war. In addition some horsed units are being retained to meet special conditions encountered in certain possible theatres of war. The Auxiliary Territorial Service for women has also been inaugurated and organized, and recruiting is proceeding satisfactorily.

54. *Royal Air Force*.—The strength of the Metropolitan Force has been increased both as regards number and power of aircraft : by the 31st March, 1939, the number of first-line aircraft will have been raised to the figure of 1,750 for which the programme due for completion at that date provided. This was extended by the programme announced in May, 1938, for a Metropolitan first line strength of approximately 2,370 aircraft, an overseas strength of 500, and the completion of the expansion of the Fleet Air Arm. Further, as announced by the Secretary of State for Air in the House of Commons on the 10th November, 1938, His Majesty's Government has decided on steps which would further increase and accelerate the programme. During 1939 the expansion of the Royal Air Force will be continued in accordance with these announcements.

55. The balloon barrage scheme, which was started last year, has now been extended to the provinces, and comprises 47 squadrons.

A separate Command has been formed for the administration and training of these units, although for operational purposes they will remain under the control of the Air Officer Commanding-in-Chief, Fighter Command, who is responsible for Air Defence as a whole. The balloon squadrons form part of the Auxiliary Air Force and are recruited locally. Recruitment for the provincial units began last month.

VII.

CIVIL DEFENCE.

56. *Organisation.*—Following the crisis of September, 1938, it was decided that the planning of Civil Defence, the co-ordination of the work of the various Departments concerned and the organisation of National Service in time of war, required the whole time attention of a Minister of Cabinet rank. A Minister for Civil Defence, holding the office of Lord Privy Seal, was accordingly appointed in November, 1938. The Lord Privy Seal is responsible for the co-ordination of policy on all aspects of Civil Defence. In addition, he has direct executive responsibility for the work of the Air Raid Precautions Department of the Home Office.

57. The Air Raid Precautions Department is responsible for settling the general principles to be followed by local authorities and the public generally, in devising precautionary measures against air raids, including protection and shelter against high explosive, gas and incendiary bombs, and for advising local authorities and the public upon the carrying out of these measures. It deals with the detailed schemes submitted by local authorities, with whom the statutory responsibility for initiating measures of local precautions rests under the Air Raid Precautions Act, 1937, and with various matters, such as air raid warnings and lighting restrictions, which are dealt with on a national basis. The Department maintains training schools and supervises local training carried out by local authorities, and supplies to local authorities and the public equipment and materials of various kinds for the provision of which the Government have accepted responsibility.

58. The staff of the Air Raid Precautions Department has been substantially increased in the last few months. Further augmentations may be required, in order to ensure that the Department is in a position to bear the great increase in work and responsibility with which it would have to cope in the event of hostilities. In pursuance of the same policy, the Department's regional organization is being greatly strengthened, a measure which will in due course facilitate a substantial measure of decentralization. In place of a Chief Inspector and 18 Regional Inspectors, a Chief Regional Officer and 38 Regional Officers, in three grades, are being appointed. These officers will be allocated among the 12 regions into which the country is divided. There will be in addition one or more Fire Brigade Inspectors in each region, and in most regions there will be a Technical Inspector specially concerned with shelters and other precautions of a structural character. Special arrangements have been made for

administrative staff to be stationed at Edinburgh, to enable Scottish problems to be handled, so far as possible, on the spot. A special organization is also being set up to deal with London.

59. The arrangements described in the foregoing paragraph are designed to link up with the local organization which would have to be established in the event of war. Effective provision must be made for the contingency of communication with the seat of Government being interrupted, and for that purpose it is proposed to have available in each region representatives, to be designated Commissioners, who would be empowered in case of need to exercise full powers by way of delegation from the Central Government. Each Commissioner would be authorised, subject to his instructions, to exercise all or any of the powers of the executive Government in civil matters if and so long as communications were cut off, or so seriously interrupted as to impede the despatch of vital business. It is proposed that suitable persons should be designated in time of peace to fill these positions, but they would have no executive responsibility in peace time and their function in advance of an emergency would be confined to acquainting themselves as fully as possible with the characteristics and personalities of their Region and with the organization of Government services therein.

60. It is desirable to make it clear that these arrangements do not in themselves affect in any way the functions of local authorities in the matter of Civil Defence. The problem of adjusting to conditions of war the machinery for the discharge of such functions is an entirely separate matter, which the Lord Privy Seal has undertaken to discuss with representatives of local authorities and in relation to which he is about to communicate with the appropriate associations.

61. Responsibility for various aspects of Civil Defence is not wholly concentrated in the Air Raid Precautions Department. The aim in this matter has been to make each Department responsible for those aspects of Civil Defence with which its peace-time functions are most closely allied. The Ministers concerned act in co-operation with the Lord Privy Seal. This arrangement makes for greater efficiency in time of peace, and would ease the strain on the Governmental machine in the transition from peace to war.

62. Thus the Ministry of Labour deals with National Service, the Ministry of Health (in respect of England and Wales) and the Department of Health for Scotland (in respect of Scotland) are responsible for schemes of evacuation, for emergency hospital services, and for approving proposals for first-aid posts and ambulance services submitted by local authorities. The Home Office and the Scottish Office deal with the war duties of the Police in England and Wales and in Scotland respectively. The Food (Defence Plans) Department of the Board of Trade acts in close collaboration with the Departments responsible for the various aspects of Civil Defence. Air raid precautions in schools (other than questions of evacuation) are dealt with by the Board of Education and the Scottish Education Department, in respect of England and Wales and Scotland respectively. Transport arrangements in time of war are being organized by the

Ministry of Transport, which is responsible for the railways, canals, road transport and docks and harbours.

63. *National Service*.—The campaign for Voluntary National Service was launched in January, 1939, with the issue of the National Service Guide of which 20,000,000 copies were printed and distributed to households throughout the country. The recruiting campaign has been directed to the whole range of the Defence Services, comprising the Regular Forces and their Auxiliaries, and the several branches of Civil Defence. At the same time, there was made available a Provisional Schedule of Reserved Occupations, drawn up by the Ministry of Labour, indicating those occupations in respect of which, in the general national interest, it is necessary that restrictions should be placed in peace-time on the acceptance of volunteers for certain forms of enlistment or enrolment for service in time of war.

64. To assist the recruiting campaign, National Service Committees were appointed by the Minister of Labour in every county and county borough in England and Wales, and in the counties and large burghs of Scotland, to stimulate the campaign for focusing public interest on the whole question of National Service, and to arrange for advice and guidance to be available to inquirers who might be in doubt as to what service they could best undertake. A considerable number of additional local committees has also been established to meet the needs of smaller boroughs and other districts within the country areas.

65. In so far as the requirements of Civil Defence are concerned, large numbers of volunteers had already come forward, particularly during and subsequent to the crisis of September 1938; but, before the National Service campaign was begun, there was a considerable shortage of volunteers in particular areas, and also shortages for certain services—in particular the Auxiliary Fire Service. It may be anticipated that, as a result of action taken to bring to public attention the various services for which volunteers are required, these deficiencies will be made good, and an adequate reserve also enrolled.

66. *Air Raid Precautions Services*.—Local authorities have been actively engaged during the year with the preparation and organization of their general Air Raid Precautions schemes. Generally, the enrolment of volunteers has proceeded satisfactorily. The estimated establishment of volunteers for general Air Raid Precautions purposes for the whole country is of the order of 1,100,000. This makes allowance for organization in reliefs and shifts, but not for reserves. Up to the end of December the numbers reported as enrolled were about 1,150,000 and in most areas good progress had been made with their training for the various duties for which they had volunteered. Much work has also been done in building up the administrative machine required for the work, in the organization and distribution of the various branches of the service and in selecting the various sites and depots from which they could operate.

67. A form of steel shelter has been designed which will afford, for dwellers in the smaller types of house, satisfactory protection from blast, splinter and the fall of debris resulting from the explosion of high-explosive bombs; and considerable distribution of these

shelters will have been made before the end of March. It is anticipated that protection will thus be provided for 10,000,000 people. It is also proposed to strengthen basements, after a survey of the premises which can be dealt with in this way. In addition, the trenches which were constructed during the September crisis are being made permanent, where they are suitably placed. The expenditure involved by these measures will be of the order of £20 millions.

68. Plans have now been completed for finding nearly 200,000 beds in existing hospitals and institutions, within twenty-four hours of a state of emergency being declared, by sending patients home and transferring them to other accommodation and by putting additional beds and equipment in the wards, and for finding about another 100,000 later by using ancillary parts of hospitals not at present used as wards. For this purpose 50,000 beds and mattresses have been obtained and are already in process of distribution. Orders have been placed for 200,000 blankets, and the Office of Works has been asked to obtain tenders for a further large supply of beds, mattresses, blankets and other bedding. Plans have been made also for linking hospitals in war time and are being discussed with the hospital authorities concerned. The Health Departments' Hospital Officers have listed buildings and land adjoining hospitals suitable for expansion, and plans for new hospital units are under active consideration.

69. The Government accepted the recommendations of the Committee on Evacuation (Cmd. 5837) in favour of the transfer, within the limits of the available accommodation in less vulnerable areas, from densely populated and vulnerable areas of certain classes of persons who could be spared. An emergency scheme was prepared in September, and, modified in the light of the experience then gained, could be put into force at any time when required. More detailed arrangements are in train, and in this connection, a circular letter was sent to all local authorities in receiving areas on the 5th January, asking for an immediate survey of available accommodation. The present plan contemplates that provision will be made for the evacuation of school children, under the supervision of teachers and other helpers, and of young children with their mothers. The situation will be reviewed in the light of the information ascertained from the survey.

70. About 840 fire precautions schemes have been received from the local authorities in Great Britain, and 710 are settled or virtually settled. In many places the local measures are well advanced, but others are more backward. Orders have been placed for approximately 18,000 pumping appliances of various types. Steps have been taken to accelerate the completion of this programme.

71. By the end of the year 40 million civilian respirators for the public had been distributed to the local authorities. During the crisis of September instructions were given for their distribution to the public. It was decided that for the time being those respirators which had been distributed to the public should remain in their possession, subject to review of the position in six months' time.

In the meantime further stocks have been accumulated to meet deficiencies.

72. Large orders for the various types of equipment required for Air Raid Precautions personnel have been placed and steps taken to accelerate delivery. A substantial reserve of sandbags is being built up and is being distributed to local authorities as deliveries come in.

73. Discussions have taken place with electricity supply, gas and water undertakings and also with the railway companies and the London Passenger Transport Board and the dock and harbour authorities, on the special measures which should be taken as a form of protection against air attack in the case of these concerns, and on the apportionment of cost between the Government and the undertakings. Legislation will shortly be introduced to make the necessary financial provision.

In the meantime the work of carrying out the measures required, and providing the necessary equipment, is in hand.

74. Arrangements are being made to provide more intensive instruction for air raid wardens and others in methods of dealing with incendiary bombs and elementary methods of protection against high explosives. The instructors' courses at the Home Office schools have already been extended for this purpose. New or revised syllabuses of instruction and other detailed guidance in relation to the training of Air Raid Precautions personnel are being issued to local authorities.

VIII.

CONCLUSION.

75. The increase in the cost of the programme, and the further borrowing powers required, are largely necessitated by the increase in our defensive strength to meet the risk of air attack. It is everywhere recognised that our armaments have no aggressive purpose. His Majesty's Government deeply deplore the need for the expenditure of these vast sums on armaments. They have already indicated that, when other nations are prepared to consider some arrangement for limitation of armaments, this country will be prepared to play its part. But in the absence of a general reduction of armaments it is inevitable that this country should continue to take the steps necessary, in the light of present developments, for its own protection and for the discharge of its responsibilities elsewhere.

76. It follows that in these circumstances it is not possible to give any precise estimate of the total cost of Defence measures over the period April 1937 to March 1942. His Majesty's Government are pressing forward with the programmes outlined in this paper. They are confident that the people of this country will be ready to bear the heavy burden involved, and will share the determination of His Majesty's Government to ensure the adequacy of our Defence preparations.

February 15, 1939.

STATEMENT ACCOMPANYING FIRST SUPPLEMENTARY NAVY ESTIMATE, 1938.

In my statement accompanying the original Navy Estimates for 1938 (Cmd. 5680) I explained that those Estimates contained nothing on account of the New Construction Programme for 1938, the details of which were contained in the Statement Relating to Defence (Cmd. 5682) and that a Supplementary Estimate would be presented in due course for so much of the work on that programme as falls to be carried out in the current financial year.

The Supplementary Estimate which I now present makes the necessary provision, amounting to £1,773,500, on this account, together with provision for the following additional services, particulars of which have already been announced to Parliament :—

- (1) Marriage allowance for Royal Naval and Royal Marine Officers, the net cost of which in the current financial year, as explained in the recent White Paper (Cmd. 5746), amounts to £264,200.
- (2) Increased marriage allowance to naval ratings, and increased pay to Special Service ratings, amounting to £730,800.
- (3) Payment of the first instalment on the purchase price of a Seaplane Carrier which is to be acquired from the Government of Australia (£92,000), and the receipt of the first instalment of the price of a Cruiser which is to be transferred to that Government on repayment (£450,000).

The total of the Supplementary Estimate is accordingly £2,410,500.

A revised Programme Statement is appended to the Supplementary Estimate showing the effect upon the current programme of shipbuilding, etc.*

DUFF COOPER.

31st May, 1938.

* *Not reproduced.*

STATEMENT showing the FURTHER SUMS required under the several VOTES concerned and the REVISED TOTAL of the ESTIMATES for the YEAR.

Vote.		Original Estimate.	Supplementary Estimate now proposed.		Revised Estimate.
			Additional Charges.	Appropriations-in-Aid (+ more or — less).	
		£	£	£	£
1	Net estimate ..	15,027,000	1,090,000	—	16,117,000
2	„ „ ..	4,421,000	—	—	4,421,000
3	„ „ ..	441,000	—	—	441,000
4	„ „ ..	4,718,000	—	—	5,718,000
5	„ „ ..	223,600	—	—	223,600
6	„ „ ..	656,000	—	—	656,000
7	„ „ ..	355,800	—	—	355,800
8. I	„ „ ..	10,094,000	27,400	—	10,121,400
8. II	„ „ ..	11,045,100	30,300	+450,000	10,625,400
8. III	„ „ ..	19,742,000	1,713,300	—	21,455,300
9	„ „ ..	10,392,000	94,500	—	10,486,500
10	„ „ ..	2,317,000	—	—	2,317,000
11	„ „ ..	1,775,300	Cr. 95,000	—	1,680,300
12	„ „ ..	1,602,500	—	—	1,602,500
13	„ „ ..	3,049,000	—	—	3,049,000
14	„ „ ..	5,485,500	—	—	5,485,500
15	„ „ ..	1,362,200	—	—	1,362,200
Total Navy Estimates :—					
	Gross Total	127,336,019	2,860,500	—	130,196,519
	Appropriations-in-Aid	33,629,019	—	+450,000	34,079,019
	Net Total	93,707,000	—	—	96,117,500

SECOND SUPPLEMENTARY ESTIMATE, 1938

VOTE A

NUMBERS of OFFICERS, SEAMEN, BOYS and ROYAL MARINES,
Borne on the Books of His Majesty's Ships, at the Royal Marine
Divisions and at Royal Air Force Establishments.

REVISED ESTIMATE	..	..	..	146,500 (a)
ORIGINAL ESTIMATE..	..	..	..	119,000
ADDITIONAL NUMBERS REQUIRED ..				<u>27,500</u>

(a) Maximum bearing.

As a result of the mobilization of the Fleet and other measures taken in connection therewith, the total number of Officers, Seamen, Boys and Royal Marines borne during the recent crisis temporarily reached a figure estimated at, but not exceeding, 146,500.

It is too early to estimate precisely the numbers which will be borne at the end of the current financial year, but it is possible that a figure of about 121,000 may be reached. The excess over the original estimate of 119,000, if it occurs, will be due to the inclusion in Vote A of additional Fleet Air Arm personnel.

A Supplementary Estimate will be presented in due course to provide for the expenditure incurred on the Pay, Allowances, Maintenance, etc., of the additional personnel called into service, which for the time being has been met from the funds voted for the services of the year.

G. H. SHAKESPEARE }
R. H. A. CARTER } Secretaries.

14th November, 1938.

STATEMENT ACCOMPANYING THIRD SUPPLEMENTARY NAVY ESTIMATE, 1938

The original provision made from revenue and Consolidated Fund for the Naval service was £128,707,000. On 31st May a Supplementary Estimate was presented on account of the New Construction Programme 1938, marriage allowance and other services, with a net additional provision of £2,410,500. On 14th November a further Supplementary Estimate was presented to make provision for an increase in Vote A of 27,500 in consequence of the crisis of last September. In the explanation accompanying that Estimate, it was intimated that the financial effect of calling into service the additional personnel required would be reflected in a third Supplementary Estimate to be presented in due course.

The Supplementary Estimate now presented makes provision for this additional expenditure for personnel and also for the rest of the expenditure caused by the mobilization of the Fleet and other emergency measures taken in September last, amounting in all to approximately £1,766,000.

Provision to the extent of £314,054 is also required on account of certain new Major Works Services which have been undertaken since the original Estimates were voted, as detailed in the Estimate now presented.

The following additions have been made to the Shipbuilding Programme for the current financial year :—

Twenty Trawlers
One Drifter.

The estimated cost of the purchase of these vessels and their conversion for the services on which they are to be employed is £490,000, and provision is taken in this Estimate for such portion of that amount as is likely to mature for payment in the current financial year.

The additional requirements for the services enumerated are estimated at approximately £2,280,000, which can be met to the extent of £529,900 from savings on the provision already made for the services of the year. The net sum required is accordingly estimated at £1,750,100, towards which it is proposed to appropriate £1,750,000 from the Consolidated Fund under the Defence Loans Act (1 Edw. 8 and 1 Geo. 6, c. 13). The net sum to be voted is therefore £100.

G. H. SHAKESPEARE }
R. H. A. CARTER } *Secretaries.*

ADMIRALTY,
March 1, 1939.

THIRD SUPPLEMENTARY ESTIMATE.

STATEMENT showing the FURTHER SUMS required under the several VOTES concerned and the REVISED TOTAL of the ESTIMATES for the YEAR.

Vote.		Original and Supple- mentary Estimates.	Supplementary Estimate now proposed.		Revised Estimates.
			Additional Charges.	Appropriations-in-Aid (+ more or — less).	
		£	£	£	£
1	Net estimate .	16,117,000	465,000	—	16,582,000
2	„ „ .	4,421,000	390,000	—	4,811,000
3	„ „ .	441,000	63,100	—	504,100
4	„ „ .	5,718,000	<i>Cr.</i> 517,000	—	5,201,000
5	„ „ .	223,600	—	—	223,600
6	„ „ .	656,000	—	—	656,000
7	„ „ .	355,800	—	—	355,800
8. I	„ „ .	10,121,400	—	—	10,121,400
8. II	„ „ .	10,625,400	300,000	—	10,925,400
8. III	„ „ .	21,455,300	950,000	+ 1,350,000	21,055,300
9	„ „ .	10,486,500	<i>Cr.</i> 521,000	—	9,965,500
10	„ „ .	2,317,000	420,000	+ 400,000	2,337,000
11	„ „ .	1,680,300	200,000	—	1,880,300
12	„ „ .	1,602,500	—	—	1,602,500
13	„ „ .	3,049,000	—	—	3,049,000
14	„ „ .	5,485,500	—	—	5,485,500
15	„ „ .	1,362,200	—	—	1,362,200
Total Navy Estimates :—					
	Gross Total . . .	130,196,519	1,750,100	—	131,946,619
	Appropriations-in-Aid .	34,079,019	—	+ 1,750,000	35,829,019
	Net Total . . .	96,117,500	100		96,117,600

STATEMENT TO ACCOMPANY NAVY ESTIMATES, 1939.

THE provision proposed for the Naval Service in 1939 is £147,779,000. This compares with £125,308,500 provided in the original Estimate for 1938 and the Supplementary Estimate of last May, an increase of £22,471,500.

In addition, the sum of £1,620,000 is required in 1939 for the service of previous issues from the Consolidated Fund under the Defence Loans Act, as compared with £810,000 in 1938.

The total provision thus required in 1939 is £149,399,000, compared with £126,117,500 in 1938, an increase of £23,281,500.

Of the total required for 1939, it is proposed to meet £80,000,000 from borrowed money against £30,000,000 in 1938. It follows that £69,399,000 will require to be met from revenue in 1939 against £96,117,500 in 1938, a decrease of £26,718,500.

The largest element in the increase over last year's Estimates is on account of New Construction. Apart from the bigger provision for work on this year's larger programme, which is being started earlier in the financial year, this increase is due to the fact that the three programmes of 1936, 1937 and 1938 are now at a stage at which the heaviest expenditure is being incurred on them.

The New Construction Programme for 1939 is :—

- 2 Capital ships.
- 1 Aircraft Carrier.
- 4 Cruisers.
- 2 Flotillas of Destroyers.
- 4 Submarines.
- 20 Fast Escort Vessels.
- 2 Escort Vessels (normal type).
- 10 Minesweepers.
- 1 Fast Minelayer.
- 1 Depot Ship for Motor Torpedo Boats.
- 1 River Gunboat.
- 1 Hospital Ship.
- 6 Motor Torpedo Boats.
- 2 Boom Defence Vessels.
- 1 Fleet Target Service Tug and a number of miscellaneous small craft.

In the principal categories of ships, this programme is larger than that of 1938 by 2 destroyer flotillas, 20 fast escort vessels of a new type, and 10 minesweepers. A new hospital ship is included, in

replacement of the old vessel *Maine*, which has passed the limit of her economical life.

Provision is also made for the commencement of work on a new Royal Yacht in place of the *Victoria* and *Albert*, which was completed in 1901, and is long since overdue for replacement.

The total cost of the 1939 programme, excluding that of the Royal Yacht, the design of which is not yet sufficiently advanced to permit an estimate to be made, is expected to be £60,500,000.

Apart from new construction, the heaviest increases this year are on account of the Fleet Air Arm, Works, and the larger bearing of personnel. These matters are dealt with in greater detail in the section headed "Notes on Matters of General Interest."

As in previous years, allowance has been made for anticipated under-spending on contract work.

STANHOPE.

ADMIRALTY,
23rd February, 1939.

NOTES ON MATTERS OF GENERAL INTEREST.

NAVAL TREATIES.

In the negotiations for the Anglo-Italian Agreement of 16th April, 1938, the Italian Government undertook to accede to the London Naval Treaty (1936) as soon as the instruments annexed to the Protocol of 16th April came into force. In fulfilment of this undertaking the Italian Government acceded to the London Naval Treaty on 2nd December last.

A multi-lateral Agreement on the lines of the London Naval Treaty (1936) was signed by representatives of Great Britain, Denmark, Finland, Norway and Sweden on December 21, 1938. The only notable difference from the London Naval Treaty is that each Scandinavian Power has the right to lay down or acquire three vessels not exceeding 8,000 tons displacement, the main armament of which consists of guns of less than 10-inch calibre, but not less than 8-inch calibre. This exception enables Scandinavian Powers to start replacing those coast defence vessels which have formed an important element of their Navies in the past. This Agreement has not yet been ratified. It enters into force on ratification by all the Signatory Powers.

On April 27, 1938, a bilateral Agreement on the lines of the London Naval Treaty (1936) was entered into with Poland. This Agreement was ratified and came into force on November 23, 1938.

On March 31, 1938, U.S.A. and Great Britain, with the consent of France, invoked the so-called "Escalator" clause, Article 25 of the London Naval Treaty, in order to increase the maximum permitted tonnage of capital ships. This action followed a refusal by Japan to give any assurances that she would not construct vessels in excess of 35,000 tons.

On June 30, 1938, the representatives of Great Britain, France and U.S.A. signed a Protocol raising the maximum Treaty limit of displacement for capital ships to 45,000 tons, whilst retaining the maximum gun calibre of 16 inches. Germany, U.S.S.R., and subsequently Italy and Poland, also signed similar Protocols recognising the new limit.

His Majesty's Government announced their intention not to exceed for the present a maximum displacement of 40,000 tons and expressed the hope that other European Powers would find it possible to abide by this voluntary limit.

Last December notification was received from Germany of her intention to exercise her right under the Anglo-German Naval Agreement of 1935 to build up to 100 per cent. of the British submarine tonnage. At the same time she also notified her intention of converting two of her cruisers now building from category (b) vessels armed with 6-inch guns to category (a) vessels carrying 8-inch armament.

Both these changes were in accordance with rights reserved to Germany under the Agreements of 1935 and 1937.

MOBILIZATION OF THE FLEET.

The mobilization of the Fleet during the September crisis was carried out smoothly, and afforded a valuable test of organization.

The majority of the Reserve Fleet ships were ready for sea considerably in advance of the notice at which they were placed.

One of the most satisfactory features of the mobilization was the fine patriotism displayed by the personnel of all the Reserves, who responded to the call on their services with great readiness and promptitude.

DISTRIBUTION OF THE FLEET.

There have been no major changes in Fleet distribution during the past year, other than the transfer of the Battle Cruiser Squadron from the Mediterranean to the Home Station.

BATTLESHIPS AND BATTLE CRUISERS.

The Repulse is being fitted out to convey Their Majesties on their visit to Canada, Newfoundland, and the United States of America during the coming Summer.

AIRCRAFT CARRIERS.

The Ark Royal, on completion, joined the Home Fleet as Flagship of Vice-Admiral, Aircraft Carriers.

The Courageous has temporarily taken over training duties from the Furious, whilst the latter is refitting.

The Argus has been reconditioned as parent ship for "Queen Bee" aircraft, and should prove a valuable addition to the A/A training facilities of the Fleet.

The seaplane carrier Albatross has been transferred from the Royal Australian Navy and was commissioned in the Royal Navy in September, 1938.

CRUISERS.

The Frobisher has replaced the Erebus as harbour training ship for cadets at Portsmouth.

The Effingham has completed her large repair and re-arming, and has replaced the Hawkins as flagship of the Vice-Admiral Commanding Reserve Fleet.

The Cairo and Calcutta are being converted to A/A ships, and other cruisers of the same class are to be similarly dealt with in 1939.

The Berwick has joined the Eighth Cruiser Squadron, and will shortly become flagship of the America and West Indies Station.

The Kent has completed large repairs and has resumed duty as flagship on the China Station.

The new Cruiser Manchester has arrived on the East Indies Station, and will shortly be joined by the Gloucester and the Liverpool.

DESTROYERS.

The 1st Tribal Destroyer Flotilla in the Mediterranean has been completed. The 2nd Tribal Flotilla, which is relieving the "B" Class in the Home Fleet, will shortly be complete.

SUBMARINES.

The new submarine minelayer Cachalot has joined the Home Fleet.

The new small submarines Undine, Unity and Ursula, of the "U" Class, have joined the 5th Flotilla at Portsmouth.

A number of submarines of the "T" class are due to join the Fleet during the coming financial year. Consequent on the above, it is intended to effect a redistribution of submarines in the Home and Mediterranean Fleets.

It is contemplated that, on completion of trials, the submarine minelayer Seal, will relieve the Odin on the China Station during the summer. The latter will return to the United Kingdom and join the 5th Flotilla at Portsmouth.

SUBMARINE DEPOT SHIPS.

The Cyclops has been relieved in the Mediterranean by the new depot ship Maidstone, and is undergoing an extensive refit at Malta before returning to the United

Kingdom to relieve the *Titania* at Portland as depot ship of the 6th Submarine Flotilla.

It is probable that the new depot ship *Forth* will, on completion, relieve the *Lucia* in the Home Fleet.

ESCORT VESSELS.

The *Auckland* and *Egret* have been completed. The former has joined the Africa Station, and the latter the East Indies Station.

PATROL VESSELS.

The *Widgeon* has joined the 1st Anti-Submarine Flotilla at Portland and the *Guillemot*, *Pintail* and *Shearwater* will, on completion, relieve older vessels.

MINESWEEPERS.

It is anticipated that the *Bramble*, *Britomart*, *Speedy* and *Sphinx*, of the 1937 programme, will join the 1st Minesweeping Flotilla during the coming year.

The *Gossamer* and *Leda* have joined the Fishery Protection Flotilla.

The small Motor Minesweepers (MMS. Nos. 1 and 2) are being used for experimental purposes.

Many of the older minesweepers have been re-armed.

MISCELLANEOUS.

China Gunboats.

The new gunboat *Scorpion* has replaced the *Bee* as flagship of Rear Admiral, Yangtse, having made the passage to China under her own power. The *Bee* will be broken up at Shanghai.

Minelayers.

The new small minelayers *Linnet*, *Ringdove* and *Redstart* have been completed. The *Redstart* is on her way to join the China Squadron.

Motor Torpedo-Boats.

Six motor torpedo-boats were shipped to Hong Kong during last autumn, and now form the 2nd Motor Torpedo-Boat Flotilla under the Commander-in-Chief, China Station.

Six motor torpedo-boats of the 1937 programme have been allocated to the Mediterranean, and it is anticipated that they will proceed to Malta during the coming year, where they will form the 3rd Motor Torpedo-Boat Flotilla.

CO-OPERATION WITH THE DOMINIONS, ETC.

AUSTRALIA.

The cruiser *Apollo* (7,000 tons), which has been purchased by the Commonwealth Government, was commissioned as H.M.A.S. *Hobart* on September 18, 1938. The Commonwealth Government has also agreed to buy the *Amphion*, which is the sister ship of the *Apollo*, and which on transfer will become H.M.A.S. *Perth*.

H.M.A.S. *Australia* paid off for re-arming on April 27, 1938. Progress is being made with the conversion of H.M.A.S. *Adelaide* to oil fuel burning.

Two Escort Vessels, to be named H.M.A.S. *Paramatta* and *Warrego*, are being built in Australia. They are due to complete at the end of 1940.

Considerable progress has been made by the Commonwealth Government towards the completion of naval seaward defences for the main ports in order to secure them against attacks by submarines and minelayers. Munitions production has been increased, shore facilities of defended ports are being expanded and an increase in personnel has been made to meet additional requirements.

The fixed coast defences of all Australian defended ports are being further strengthened.

CANADA.

H.M. Canadian Ships *Ottawa* (late *Crusader*) and *Restigouche* (late *Comet*) were commissioned on April 6, 1938, and June 11, 1938, respectively, for service in Canadian waters, having been purchased by the Dominion.

Canada now possesses a naval force of six modern destroyers. The addition of a flotilla leader, to be purchased from the Royal Navy, is under consideration.

NEW ZEALAND.

The Dominion has retained in commission the two cruisers of the New Zealand Division, H.M. Ships Achilles and Leander.

SOUTH AFRICA.

The fixed defences at Simonstown and Capetown are to be further increased and modernized. Pending the completion of the defences at Capetown, the monitor Erebus, which is being re-conditioned and re-armed at the expense of the Union Government, will proceed to Capetown.

The whole question of South African defence against seaborne attack was discussed with Mr. Pirow, the Union Minister for Defence, during his visit to this country in the Autumn.

The South African R.N.V.R. continues to be a successful and enthusiastic force.

INDIA.

The subvention of £100,000 annually paid by the Government of India in respect of services rendered by the Royal Navy ceased on April 1, 1938. Thereafter India became responsible for the provision of 6 modern escort vessels which would co-operate with the Royal Navy in war, and for the building up of her local naval defences. The whole question of the defence of India has been reviewed by an Expert Committee under the Chairmanship of Lord Chatfield.

FLEET ACTIVITIES.

HOME.

His Majesty the King visited the Home Fleet at Weymouth on June 21 and 22, 1938, when he led the Fleet to sea in the Flagship of the Commander-in-Chief for exercises.

Their Majesties were conveyed across the Channel, on the occasion of their visit to the President of the French Republic in July, in H.M.S. Enchantress, escorted by the 5th Destroyer Flotilla.

H.M.S. Sikh conveyed His Majesty King Carol of Roumania across the Channel on the occasion of his State visit in November.

The body of Her late Majesty the Queen of Norway was taken from Portsmouth to Oslo in H.M.S. Royal Oak in November, and His Majesty the King of Norway and the Crown Prince of Norway took passage in the ship.

MEDITERRANEAN.

A number of H.M. ships, which has varied according to the requirements of the situation, continue to be employed on patrol duties in accordance with the Nyon Arrangement, and in pursuance of the policy of His Majesty's Government to afford protection to British ships outside territorial waters during the Spanish Civil War.

During the year under review H.M. ships have continued to take every possible opportunity of rendering humanitarian assistance in connection with the civil war in Spain, and, in particular, in the evacuation of refugees.

The Commander-in-Chief, Mediterranean, in H.M.S. Malaya proceeded to Istanbul in connection with the funeral of Kemal Ataturk in November. The Commander-in-Chief and a Naval and Marine detachment attended the funeral at Angora.

The submarine Thames completed a cruise round the continent of Africa during the winter, and has just returned to Malta, after an absence of three months.

An Italian Squadron of 2 battleships and 4 destroyers visited Malta in June, and a Greek Squadron of 1 cruiser, several destroyers and submarines, in September.

PERSIAN GULF.

In October, H.M. ship Fowey and Deptford were sent to Debai as a precautionary measure for the protection of British subjects.

The escort vessels stationed in the Gulf have continued their work of assisting the political officers in maintaining our treaty obligations to the various Arab rulers, and have also maintained the usual anti-slavery patrols, etc.

RED SEA.

In August, H.M.S. Fleetwood conveyed H.R.H. The Crown Prince of Saudi Arabia from Jeddah to Port Sudan.

The usual anti-slavery, etc., patrols have been maintained.

AMERICA AND WEST INDIES.

H.M.S. Ajax proceeded to Jamaica in May, in connection with the rioting which had broken out in that island. Fifty marines were landed, but their services were not called upon. Ajax's aircraft did useful work in assisting the local authorities.

The cruiser Exeter and Ajax, of the South American Division, have been actively engaged in relief work in connection with the recent earthquake in Chile. Large numbers of refugees have been transported and assistance has also been given in the carriage of vaccines by air. An expression of gratitude on behalf of the Government and people of Chile has been received.

EAST INDIES.

H.M.S. Stork visited Male for the proclamation of the Sultan of the Maldives on 21st July.

CHINA.

H.M. ships have been stationed, as necessary, to give the greatest assistance and protection practicable to British nationals and interests.

A force composed of officers and men from the Squadron was sent to Hankow prior to the Japanese occupation, in order to provide increased protection for British life and property.

The duties of the gunboats on the Yangtse have been arduous, and at times dangerous, as was exemplified by the narrow escape from bombing of H.M.S. Sandpiper, in the course of an air raid by Japanese aircraft at Changsha in October.

With the capture of Canton by the Japanese, similar conditions have been experienced by the West River gunboats.

AFRICA.

The Commander-in-Chief, Africa, in the Amphion, visited Loanda in July, during the visit of the President of the Portuguese Republic.

H.M.S. Milford, on passage from the United Kingdom to the Cape, visited Tristan da Cunha on 27th March and landed stores.

FISHERY PROTECTION.

The work of the Fishery Protection and Minesweeping Flotilla in protecting and assisting the Fishing Fleets, and in training officers and men of the Reserve in mine-sweeping, has been continued.

During the past year the Captain, Fishery Protection and Minesweeping, and vessels under his command, visited ports in Belgium, Denmark, Farøe Islands, France, Germany, Holland, Iceland and Norway.

PROTECTION OF SHIPPING.

As in previous years the Admiralty plans for the protection of shipping in time of war have been constantly under review. The mobilization in September, 1938, made it possible to test certain aspects of our organization in a manner not normally possible. These tests were satisfactory, and the lessons learnt therefrom have enabled us to strengthen our arrangements.

Throughout the year close touch has been maintained with the Board of Trade, and with the shipping interests. The formation of the Shipping Defence Advisory Committee, referred to in the First Lord's statement when presenting the Navy Estimates for 1938, has had most valuable results, and many useful suggestions received from this source have been acted on.

Considerable work has been done whereby the arming of merchant ships on the outbreak of war could be rapidly effected. It is emphasized that the type of armament contemplated is purely of a defensive character. The ready co-operation of ship-owners is gratefully acknowledged.

HYDROGRAPHY.

During 1938, H.M. Surveying Ships have been employed in making new surveys or re-surveys as necessary, the number of ships so engaged being, as in former years, four at home and four abroad.

Of the latter, one has been employed in the China Sea, one in the East Indies, one in New Zealand and one in the West Indies and Persian Gulf.

Three new ships have been commissioned; the Gleaner replaced the Beaufort in April; the Jason replaced the Flinders in June; and the Franklin replaced the Kellett in August.

It is anticipated that the new vessel Scott will replace the Fitzroy before the commencement of the 1939 season. The home surveying fleet will then consist of four new ships, namely, the Jason and Gleaner, convertible to minesweepers at short notice, and the Franklin and Scott, fitted solely for surveying work.

The tidal stream survey of the British Isles has been continued and satisfactory progress made. As in former years, the French Hydrographic Office has collaborated.

The Hydrographer of the Navy attended the Assembly of the International Council for the Exploration of the Sea at Copenhagen in May and the International Geographical Congress at Amsterdam in July.

Progress in the building and equipment of the Royal Research Ship Research has been satisfactory.

METEOROLOGY.

The Naval Meteorological branch which was recently established under the Hydrographer of the Navy to organise such work in the Fleet, has made considerable progress in the fitting of ships with necessary equipment and in the training of Officers in meteorology.

A new publication, The Admiralty Weather Manual, has been prepared as a standard text book of Naval Meteorology and is on sale to the public.

NAVIGATION.

The provision of H.M. Ships with modern aids to navigation continues to receive close attention.

New tables are being produced by the Nautical Almanac Office, which will make it possible to shorten the time required for obtaining a position from celestial observations.

FLEET TRAINING.

The combined Home and Mediterranean Fleets carried out a series of Exercises in March, 1938, the majority of which were of a tactical nature. An important exercise by the Home Fleet was also held in the North Sea during the summer, in which the aircraft of the Coastal Command of the R.A.F. co-operated. These exercises afforded excellent training to officers and men, and valuable experience was gained.

Apart from these, frequent opportunities have been taken to exercise ships in their tactical functions and progress continues to be satisfactory.

CO-OPERATION BETWEEN THE SERVICES.

The international situation during 1938 interfered to some extent with combined exercises in conjunction with the other two Services. It has, nevertheless, proved possible to carry out valuable exercises of this nature both at home and abroad, with the object of practising the landing of troops and testing the defences of ports.

The usual exercises between the Staff Colleges of the three Services have taken place. As in previous years, every opportunity has been taken to practise Squadrons of the Coastal Command R.A.F. in locating and attacking H.M. ships.

An Inter-Service Training and Development Centre, under the command of a Captain, Royal Navy, has been established at Portsmouth with the object of studying and advising on all questions relating to Combined Operations.

THE FLEET AIR ARM.

Steady progress is being made in the arrangements for the assumption of administrative control by the Admiralty. The difficulties of transfer are greatly enhanced by the expansion of the Fleet Air Arm, which is taking place simultaneously.

As was explained in the First Lord's Statement last year, the initial training of

pilots and the training of maintenance personnel for the Fleet Air Arm will remain the responsibility of the Air Ministry. It is anticipated, however, that the Admiralty will assume responsibility for the specialized training of pilots and other flying personnel at an early date. With this object in view, it is hoped to arrange for the transfer from the R.A.F. to the Fleet Air Arm, early in the present year, of bases where the specialized training will be carried out, in addition to the training of disembarked squadrons. Insofar as the number of bases to be transferred will not be sufficient for the Navy's needs, it is proposed that the deficiency should be made up by the construction of new bases or by using R.A.F. stations on a shared basis. A Rear-Admiral will be appointed to administer the Royal Naval Air Stations.

A Short-Service scheme for Pilot and Observer Officers has been instituted, providing for 7 years' service in the first instance, followed by 8 years in the Reserve. A large number of officers have been entered under this Scheme and are now under training. A number of officers have also been transferred from the Royal Air Force to the Air Branch of the Royal Navy. Officers of the Royal Navy are being trained for the special technical and armament duties required in the Fleet Air Arm.

In addition, a number of ratings are being trained for pilot duties.

Progress is also being made in the provision of the maintenance rating who will be required for the maintenance of Fleet Air Arm material. A number of fitters, riggers, mechanics and R.A.F. apprentices have volunteered for transfer to the Navy, and arrangements are being made for large numbers of personnel, provided by volunteers from the Fleet and entries from outside, to be trained in the various grades. Nevertheless, for some time to come the Navy will have to depend on the R.A.F. for the provision of many of these ratings, particularly in view of the time taken to provide the more skilled grades.

It will also be necessary, for some considerable time, to supplement the pilots of the Fleet Air Arm by pilots lent from the R.A.F. Arrangements have been agreed upon between the Departments for the administration during the transitional period of all personnel thus lent.

Attention has been paid to the provision of increased reserves of personnel for the Fleet Air Arm. In particular, a new Air Branch of the R.N.V.R. for officers has been instituted.

Substantial orders for aircraft of the various types, for delivery over the next two to three years, have been placed to meet the expansion programme. It is expected that the transfer of Fleet Air Arm aircraft, stores and equipment, from the Air Ministry to the Admiralty will take place early in the new financial year.

The title of the member of the Board of Admiralty responsible for Naval Air matters has been altered to Fifth Sea Lord. On further examination it has been found desirable to separate from the Department of Air Material the function of repair and maintenance, which has been entrusted to a new Repair and Maintenance Department.

Arrangements are progressing with the Air Ministry for the improvement of the liaison between the two Departments in matters of research, development and supply, and additional Naval and Admiralty civil officers are being appointed to serve in the Air Ministry Departments in pursuance of this object.

Vote 4, on which the bulk of the expenditure for the Fleet Air Arm has so far been borne in the shape of a Grant in Aid to Air Votes, will no longer appear in the Estimates. The cost will be absorbed into the normal Navy Votes for the services in question, e.g., Personnel, Vote 1 and Victualling, Vote 2, etc.

PERSONNEL.

Recruiting for the Royal Navy and Royal Marines has continued to be very satisfactory, although difficulties are being encountered in providing a sufficient number of engine-room artificers, electrical artificers and ordnance artificers for the next two or three years. It is hoped to overcome these difficulties with the sympathetic co-operation of industry.

The training of the increased numbers of officers and men required has continued to present difficulties, which have, with a certain amount of improvisation, been successfully surmounted.

Entries of cadets into the Royal Naval College, Dartmouth, and by the Special Entry examination have remained at the same level as last year, the numbers being as follows :—

Cadets entering Dartmouth in 1938	..	..	..	131
Executive Special Entry Cadets	..	..	..	100
Engineer Special Entry Cadets	..	..	..	61
Paymaster Cadets	..	..	..	40

In addition a number of cadets were entered by nomination from the Dominions, the special examination for the Mercantile Marine Training Establishments and promotion from Artificer Apprentices.

The standard of all these young officers has been satisfactory, but the number of candidates for the Engineer Branch is smaller than could be desired.

Difficulties are still being encountered in entering a sufficient number of Medical and Dental Officers to meet requirements.

The Erebus, formerly employed in affording initial training of the Special and Direct Entry Cadets, has been replaced by the Frobisher, and the Vindictive continues to provide sea training for Cadets.

The continued expansion of the Fleet has necessitated the re-employment of a considerable number of retired officers and the transfer of further officers to the Royal Navy from the Royal Naval Reserve.

Promotion for naval ratings continues to be rapid, in both substantive and non-substantive rates.

The amendments to the scheme for direct promotion from the lower deck first tried in 1937 have, on the whole, proved satisfactory. In 1938, 17 ratings were promoted to Acting Sub-Lieutenant and 7 to Acting Sub-Lieutenant (E). 42 ratings are undergoing the special course in sea-going ships.

Conditions of service of officers have been examined by a specially appointed Committee, and as a result, half pay has been abolished throughout the Service for all officers whom it is intended to employ again (except, of course, when unemployed at their own request or for disciplinary reasons). On the other hand, provision has been made whereby officers whom it is not intended to employ again can be placed on the retired list without delay, instead of being kept on half pay for long periods.

In addition to the grant of marriage allowance to naval officers, which was explained in the White Paper presented by the First Lord last May (Cmd. 5746), there have been minor increases in the scales of pay for Lieutenant-Commanders and Commanders.

Various minor improvements have also been made in the conditions of service for Warrant Officers which, with the marriage allowance, should increase the attractions of that rank for the more senior ratings.

The rate of marriage allowance for men of the Royal Navy and Royal Marines has been increased to seventeen shillings a week.

The rates of pay of naval ratings on special service engagements have been raised to correspond with the rates of pay of naval ratings entered for continuous service.

The gunnery branch has, so far as ratings are concerned, been re-organized to provide the larger measure of specialisation which is now required by reason of the progressive increase in complex mechanism and the developments in anti-aircraft gunnery.

Steps have been taken to expand the Naval Reserves. In particular, anti-aircraft training is being introduced in the R.N.V.R. with the object of providing trained guns' crews for ships in reserve. A considerable increase in the establishment of the R.N.V.R. will be involved, and additional divisions will be set up at Southampton, Hull, and Cardiff.

A new "Immediate" class of the Royal Fleet Reserve is being formed, composed of men who undertake to serve, if required, at a time when the Royal Fleet Reserve has not been called into actual service. These men will receive a larger retainer than the ordinary reservists.

The Royal Naval Volunteer (Wireless) Reserve has been constituted under the Naval Forces Act, 1903, in place of the Royal Naval Wireless Auxiliary Reserve, to provide for the training of amateur wireless operators for service in the Navy in war.

Arrangements are being made to provide training in gunnery for Merchant Navy Seamen, to ensure that the defensive armaments which may need to be installed in merchant ships in war can be efficiently operated by men of the Merchant Navy.

MATERIAL.

BATTLESHIPS.

1936 Programme.

Work on the King George V and Prince of Wales is proceeding satisfactorily at the works of Messrs. Vickers-Armstrongs, Ltd., Walker-on-Tyne, and Messrs. Cammell Laird & Co., Ltd., Birkenhead, respectively. The King George V was launched by His Majesty The King on 21st February, and the Prince of Wales will be launched in May.

1937 Programme.

Work on three battleships of the King George V class, Duke of York, Jellicoe and Beatty is proceeding satisfactorily at the works of Messrs. John Brown & Co., Ltd., Clydebank; Messrs. Swan Hunter & Wigham Richardson, Ltd., Wallsend-on-Tyne; and Messrs. Fairfield Shipbuilding & Engineering Co., Ltd., Govan, respectively. These ships will be launched in the financial year 1939.

1938 Programme.

Orders for two battleships of new design were placed on February 21, 1939, with Messrs. Vickers-Armstrongs, Ltd., Walker-on-Tyne, and Messrs. Cammell Laird & Co., Ltd., Birkenhead.

AIRCRAFT CARRIERS.

1934 Programme.

The Ark Royal, constructed by Messrs. Cammell Laird & Co., Ltd., was completed in November, 1938.

1936 Programme.

Construction of the Illustrious and Victorious at the works of Messrs. Vickers-Armstrongs, Ltd., at Barrow-in-Furness and High Walker, respectively, is proceeding satisfactorily, and they are expected to be launched in April and September next, respectively.

1937 Programme.

The Formidable and Indomitable, of the "Illustrious" class, under construction by Messrs. Harland & Wolff, Ltd., Belfast, and Messrs. Vickers-Armstrongs, Ltd., Barrow-in-Furness, respectively, are progressing satisfactorily, and are due to be launched in the financial year 1939.

1938 Programme.

A further aircraft carrier was ordered from Messrs. The Fairfield Shipbuilding & Engineering Co., Ltd., on October 11, 1938.

CRUISERS.

1935 Programme.

The Liverpool and Manchester, constructed by Messrs. The Fairfield Shipbuilding & Engineering Co., Ltd., and Messrs. R. & W. Hawthorn Leslie & Co., Ltd., respectively, and the Gloucester, built at Devonport Dockyard, have been completed.

1936 Programme.

The Belfast, building by Messrs. Harland & Wolff, Limited, was launched on March 17, 1938, and the Edinburgh, building by Messrs. Swan Hunter & Wigham Richardson, Limited, on March 31, 1938. Both vessels, of the improved Southampton class, are expected to complete during the summer of 1939. Construction of the "Dido" class vessels, Dido (Messrs. Cammell Laird & Co., Ltd.), Euryalus (Chatham Dockyard), Naiad (Messrs. R & W. Hawthorn Leslie & Co., Ltd.), Phoebe (The Fairfield Shipbuilding & Engineering Co., Ltd.), and Sirius (Portsmouth Dockyard) is proceeding satisfactorily. Naiad was launched in February, 1939, and the remaining four vessels will be launched at intervals between now and November.

1937 Programme.

The ships of the "Fiji" class have been laid down as follows :—

Fiji	Building by Messrs. John Brown & Co., Ltd., March 30, 1938.
Kenya	Building by Messrs. Alexander Stephen & Sons, Ltd., June 18, 1938.
Mauritius	Building by Messrs. Swan Hunter & Wigham Richardson, Ltd., March 31, 1938.
Nigeria	Building by Messrs. Vickers-Armstrongs, Ltd., February 8, 1938.
Trinidad	Building by H.M. Dockyard, Devonport, April 21, 1938.

Work is proceeding satisfactorily.

Work on the *Bonaventure* (Messrs. Scott's Shipbuilding & Engineering Co., Ltd.), and *Hermione* (Messrs. Alexander Stephen & Sons, Ltd.), both of the "Dido" class, is proceeding satisfactorily and the vessels are expected to be launched shortly.

1938 Programme.

Orders for a further three ships of the "Dido" class were placed in August, 1938, as follows :—*Charybdis* with Messrs. Cammell Laird & Co., Ltd., *Cleopatra* with Messrs. R. & W. Hawthorn, Leslie & Co., Ltd., *Scylla* with Messrs. Scott's Shipbuilding & Engineering Co., Ltd.

The keel plates of *Charybdis* and *Cleopatra* were laid on November 9, 1938, and January 5, 1939, respectively. *Scylla* will be laid down shortly.

Orders for the *Ceylon*, *Gambia*, *Jamaica* and *Uganda* of the "Fiji" class will be placed shortly.

MINELAYERS.

Orders for three fast minelayers of the 1938 Programme were placed on December 23, 1938, as follows :—

Abdiel	..	Messrs. J. S. White & Co., Ltd., Cowes.
Latona	..	Messrs. J. I. Thornycroft & Co., Ltd., Southampton.
Manxman	..	Messrs. A. Stephen & Sons, Ltd., Govan.

LEADERS AND DESTROYERS.

1935 Programme.

The seven "Tribal" class destroyers *Afridi*, *Cossack*, *Gurkha*, *Maori*, *Mohawk*, *Nubian* and *Zulu* were delivered and accepted during the period April to December, 1938.

1936 Programme.

Of the further nine destroyers of the same class, the *Ashanti*, *Eskimo*, *Matabele*, *Sikh* and *Somali* have been delivered and accepted. The remaining four vessels, *Bedouin*, *Mashona*, *Punjabi* and *Tartar* have successfully carried out their completion trials and are due for delivery very shortly.

The flotilla leader *Jervis* and the "Javelin" class destroyers *Javelin*, *Jackal*, *Jaguar*, *Janus*, *Jersey*, *Juno* and *Jupiter*, have all been launched and are expected to complete by the summer of 1939.

1937 Programme.

The flotilla leader *Kelly* and the seven destroyers *Kashmir*, *Kandahar*, *Kelvin*, *Khartoum*, *Kimberley*, *Kingston* and *Kipling*, are progressing satisfactorily and are expected to complete during the financial year, 1939.

Orders for the leader and destroyers of the "Laforey" class were placed on March 31, 1938, as follows :—

Laforey (leader) and Lance	..	Messrs. Yarrow & Co., Ltd., Scotstoun.
Larne and Lively	.. ..	Messrs. Cammell Laird & Co., Ltd., Birkenhead.
Legion and Lightning	.. ..	Messrs. Parsons' Marine Steam Turbine Co., Ltd., Wallsend.
		(Hulls by Messrs. R. & W. Hawthorn, Leslie & Co., Ltd., Hebburn-on-Tyne).
Lookout and Loyal	.. ..	Messrs. Scott's Shipbuilding & Engineering Co., Ltd., Greenock.

The vessels are expected to be launched during the coming financial year.

SUBMARINES.

1935 Programme.

Sterlet, the last of the "Swordfish" class, was completed at Chatham Dockyard in April, 1938.

The minelayer submarine *Cachalot*, of the "Porpoise" class, was completed by Messrs. Scott's Shipbuilding & Engineering Co., Ltd., in August, 1938.

Triton, the first of a new class of patrol submarine was delivered by Messrs. Vickers-Armstrongs, Ltd., in November, 1938.

1936 Programme.

The minelayer submarine *Seal*, under construction at Chatham Dockyard, was launched in September, 1938, and is expected to be completed in the course of the next few months.

Work is proceeding normally on the four submarines *Thetis*, *Trident*, *Tribune* and *Triumph*, of the "Triton" class; the vessels have all been launched and should complete at varying dates during the financial year, 1939.

Unity, *Undine* and *Ursula*, small submarines of the "Unity" class, were completed by Messrs. Vickers-Armstrongs, Ltd., in October, August and December, 1938, respectively.

1937 Programme.

Work is progressing satisfactorily on the seven submarines of the "Triton" class, viz., *Thistle*, *Triad* and *Truant* (Messrs. Vickers-Armstrongs, Ltd.), *Taku* (Messrs. Cammell Laird & Co., Ltd.), *Tarpon* and *Tuna* (Messrs. Scott's Shipbuilding & Engineering Co., Ltd.), and *Tigris* (Chatham Dockyard). *Thistle* has been launched and all the seven vessels should be completed in the financial year 1939.

1938 Programme.

Further vessels of the "Triton" class have been ordered as follows:—

<i>Tetrarch</i>	..	Messrs. Vickers-Armstrongs, Ltd. ; keel laid August 24, 1938.
<i>Talisman</i>	..	Messrs. Cammell Laird & Co., Ltd. ; keel laid September 27, 1938.
<i>Torbay</i>	..	Chatham Dockyard ; keel laid November 21, 1938.

ESCORT VESSELS.

1936 Programme.

The *Egret* was completed by Messrs. J. S. White & Co., Ltd., and the *Auckland* by Messrs. Wm. Denny & Bros., Ltd., in November, 1938.

1937 Programme.

The *Pelican*, under construction by Messrs. J. I. Thornycroft & Co., Ltd., is expected to be completed in March, 1939. The construction of the *Black Swan* and *Flamingo*, by Messrs. Yarrow & Co., Ltd., is proceeding satisfactorily and they should be completed by next autumn.

MINESWEEPERS.

1936 Programme.

The *Leda* and *Seagull* were completed at Devonport Dockyard in May and July, 1938, respectively, the *Gossamer* by Messrs. W. Hamilton & Co., Ltd., in March, 1938, and the *Jason* by the *Ailsa* Shipbuilding Co., Ltd., in June 1938.

1937 Programme.

The construction of the *Bramble* and *Britomart* at Devonport Dockyard, and the *Speedy* and *Sphinx* at the works of Messrs. W. Hamilton & Co., Ltd., is progressing satisfactorily, and the vessels are expected to be completed by the summer of 1939.

PATROL VESSELS.

1936 Programme.

The *Widgeon* was completed by Messrs. Yarrow & Co., Ltd., in June, 1938.

1937 Programme.

The *Guillemot* and *Pintail*, ordered from Messrs. Wm. Denny & Bros., Ltd., and the *Shearwater*, from Messrs. J. S. White & Co., Ltd., in April, 1938, are expected to be completed during the financial year 1939.

DEPOT SHIPS.

The submarine depot ship *Maidstone* (1935 programme) was completed by Messrs. J. Brown & Co., Ltd., in May, 1938.

The submarine depot ship *Forth* (1937 programme), under construction by Messrs. J. Brown & Co., Ltd., was launched in August, 1938, and is expected to be completed shortly.

The submarine depot ship *Adamant* (1938 programme) will be ordered shortly.

The destroyer depot ship Tyne (1937 programme), ordered from Messrs. Scott's Shipbuilding & Engineering Co., Ltd., was laid down in July, 1938, and construction is progressing satisfactorily.

The destroyer depot ship Hecla (1938 programme), ordered from Messrs. J. Brown & Co., Ltd., in November, 1938, was laid down on January 23, 1939.

FLEET AIR ARM SUPPLY AND REPAIR SHIP.

The Unicorn (1938 programme) will be ordered shortly.

OTHER VESSELS.

The Franklin, surveying vessel (1936 programme), was completed by Messrs. The Ailsa Shipbuilding Co., Ltd., in August, 1938. A similar vessel, the Scott (1937 programme), under construction by the Caledon Shipbuilding & Engineering Co., Ltd., is nearing completion.

River Gunboats.—The Scorpion (1936 programme), built at Cowes, was steamed to Hong Kong, and completed there by Messrs. J. S. White & Co., Ltd., in December, 1938. The Dragonfly and Grasshopper (1937 programme) are progressing satisfactorily at the works of Messrs. J. I. Thornycroft & Co., Ltd., and should be delivered during the coming summer; the Dragonfly was launched in December, 1938, and the Grasshopper in January, 1939. The Locust and Mosquito (1938 programme) were ordered in June, 1938, from Messrs. Yarrow & Co., Ltd., and were laid down in November and December, respectively.

The magnetic survey vessel Research (1935 programme), under construction by Messrs. Philip & Son, Ltd., is expected to be launched shortly. The difficulty in obtaining suitable non-magnetic material for the construction of the auxiliary engine has been overcome.

The sixteen boom defence vessels of the "Barricade" class (1935, 1936 and 1937 programmes), have been completed and the remaining vessel will be completed shortly.

The six boom defence vessels of the "Bayonet" class (1937 programme) are progressing satisfactorily, the Bayonet and Falconet at Blyth, the Magnet and Martinet at Middlesbrough, the Planet and Plantagenet at Renfrew. The vessels are expected to be completed shortly. Five further boom defence vessels of this class (1938 programme), were ordered from Messrs. The Blyth Dry Docks & Shipbuilding Co., Ltd., Blyth, the Bownet, Burgonet, Dragonet in June, 1938, and the Signet and Sonnet in July, 1938. Completion of these five vessels is expected between May and October next.

The trawler Mastiff (1936 programme) was completed by Messrs. Henry Robb, Ltd., Leith, in May, 1938.

The cable ship Lasso (1936 programme) was completed by Messrs. J. I. Thornycroft & Co., Ltd., in June, 1938.

The minelayer Linnet (1936 programme) was completed by Ardrossan Dockyard, Ltd., in June, 1938, and the Redstart and Ringdove (1937 programme) by Messrs. Henry Robb, Ltd., Leith, in October and December, 1938, respectively.

The tug Bandit (1937 programme) was completed by Messrs. Fleming & Ferguson, Ltd., Paisley, in May, 1938; the tug Marauder (1938 programme), ordered from the same firm, is due for completion in May, 1939. The tug Impetus (1938 programme) is expected to be ordered shortly.

One further motor torpedo boat and one motor vessel of the 1936 programme, ordered from the British Power Boat Co., Ltd., have been completed. Messrs. J. S. White & Co., Ltd., are proceeding with the motor torpedo boat of special design (1936 programme). Of the nine motor torpedo boats (1937 programme) ordered from the British Power Boat Co., Ltd., five have been completed. Twelve motor torpedo boats and motor vessels of the 1938 programme have been ordered as follows:—Five from the British Power Boat Co., Ltd., five from Messrs. Vosper, Ltd., and two from Messrs. J. I. Thornycroft & Co., Ltd.

The two motor minesweepers (1936 programme) were completed by Messrs. J. I. Thornycroft & Co., Ltd., in May, 1938.

The mooring lighter Moorland (1937 programme) has recently been completed by Messrs. W. Simmons & Co., Ltd. The steam tug and water tank vessel Wave (1937 programme), under construction by Messrs. The Taikoo Dockyard & Engineering Co., Hong Kong, is nearing completion.

The ferry boat Magician (1938 programme) is expected to be ordered shortly.

Twenty commercial trawlers and one drifter are being acquired for various fleet services, as additions to the 1938 programme.

LARGE REPAIRS.

Work on Renown and Queen Elizabeth at Portsmouth, and Valiant at Devonport, is proceeding satisfactorily.

The Revenge, taken in hand at Devonport in December, 1938, for refit and A/A rearmament, will be completed during the summer of 1939.

The work on Argus and Effingham has been completed at Devonport.

H.M.A.S. Hobart (originally Apollo) has been refitted at Devonport and transferred to the Australian Navy. Amphion (to be renamed H.M.A.S. Perth) has been taken in hand at Portsmouth for refitting, prior to transfer to the Australian Navy.

The escort vessels Folkestone and Scarborough are to be converted for surveying service. Scarborough is in hand at Chatham, and Folkestone will be taken in hand later at Hong Kong.

The old destroyer Whitley has been converted to an escort vessel, and the proposed programme allows of a number of similar vessels being so converted during the coming financial year.

The repairs to the Hunter, damaged by a mine in May, 1937, off the Spanish coast, have been completed at Malta.

NAVAL WORKS.

The increase in the effective strength of the Royal Navy and the decision to transfer the Fleet Air Arm to the control of the Admiralty are reflected in the increased provision which it is necessary to make this year for Vote 10.

It is proposed to make provision next year for the commencement of works to provide accommodation for Fleet Air Arm personnel at certain of the shore bases which it is anticipated will be transferred from the Royal Air Force.

Provision is also made for the commencement of work on a new cordite factory, which is necessary to meet the cordite requirements of the growing fleet.

At Portsmouth it is intended to commence work on lengthening No. 8 dock, which is urgently necessary to meet increased docking requirements. This proposal will provide accommodation for dry docking destroyers up to 400 feet in length, thereby leaving the larger docks for cruisers.

At Devonport provision is made for a new berth for cruisers on the north wall of No. 4 basin.

At Singapore work is being pressed forward in connection with the completion of the north wharf and store basin walls, and in particular the erection of accommodation for the crews of vessels refitting there. A second electric generating station is being provided.

MISCELLANEOUS.

Welding investigations have been continued, particularly research concerning the welding of high-tensile steels, which has been carried out in conjunction with the Institute of Welding. The all-welded minesweeper Seagull, which completed at Devonport in July, 1938, was sent to sea for rough weather tests. The results were satisfactory.

Experiments have continued to ascertain the best methods of mitigating the damaging effect of various weapons on warships, including submarines.

Progress has been made in the application of the results of study of air flow round ships and their control positions.

Research, experimental and development work continues with a view to ensuring that the electrical equipment of the Fleet is kept abreast of modern progress.

BOILERS.

Advances in obtaining higher outputs from a given weight continue to be sought.

During the past year special shore trials have been carried out on an Admiralty type boiler and, as a result, investigations are now in hand with a view to ascertaining whether increases in the rate of burning oil fuel can be achieved by improved methods.

Valuable practical knowledge has been obtained from experience on service of boilers of types other than the standard Admiralty type.

In order to establish the relative value of various different types of air preheater, various designs are being incorporated in the boilers of cruisers.

FUEL.

During the past year considerable time has been devoted to detailed investigations of the claims put forward recently in favour of a return to coal burning in warships.

These investigations have proved conclusively that, on the major counts, weight and space required and operation, a return to coal burning would impose such a handicap on our ships as to be definitely unacceptable.

With a view to widening the field of supply of fuel oils for internal-combustion engines and boilers, trials have been carried out on fuels from alternative sources of supply.

MATERIALS.

Investigations into the properties and uses of new alloy steels, high strength cast irons, light alloys and other non-ferrous material have been continued with the object of reducing the weight of machinery installations without sacrifice of reliability and also of extending the sources of supply. Special attention has been directed to the study of wear in submarine engines, and to the general problems of metallic corrosion.

INTERNAL-COMBUSTION ENGINES.

In order to investigate the potentialities of the various types of submarine engine available, several different designs, including an Admiralty design, are being constructed for current programme submarines. Meanwhile, new types are being advanced as a result of the work at the Admiralty Engineering Laboratory.

The work of developing high-powered high-speed engines suitable for motor torpedo boats is progressing satisfactorily, and trials are expected shortly.

A new type of high-speed compression ignition engine suitable for driving electric generators is being purchased for trial.

AIRCRAFT EQUIPMENT.

New types of catapult are under construction for installation in new construction battleships and cruisers.

REFRIGERATION.

Conditions of service in H.M. ships, particularly in hot climates, is being improved by the extension of the supply of domestic automatic refrigerators.

WATER PURIFYING PLANT.

Attention has been given to the supply, in new ships and those undergoing large repairs, or modernisation, of water purifying plant.

ARMAMENT.

Research and experimental work on gun armament material continues.

The augmentation of the anti-aircraft armament of the Fleet and the modernization of the armament of certain ships continues to make progress.

New sources of supply are still being arranged, and expansion of existing sources continues. As a measure of the great increase in productive effort being devoted to naval gun armaments, the ratio of production for the years 1935 and 1939 is as follows :—

	1935.	1939.
Guns and mountings	1	5
Fire control and director gear	1	9

TORPEDOES.

Development work on torpedoes has proceeded with satisfactory results, enabling improved performance to be obtained.

Close co-operation exists between the Admiralty and Air Ministry regarding the development of torpedoes for use from aircraft.

ABSTRACT OF NAVY ESTIMATES FOR 1939.

Votes.		Estimates 1939.†		Estimates 1938.
		Gross Estimate.	Net Estimate.	Net Estimate.
	I.—NUMBERS.		Maximum Numbers.	Maximum Numbers.
A	Number of Officers, Seamen, Boys, and Royal Marines	133,000	133,000	146,500
	Number of Royal Marine Police	976	976	913
	II.—EFFECTIVE SERVICES.	£	£	£
1	Wages, etc., of Officers and Men of the Royal Navy, and Royal Marines, and Civilians employed on Fleet Services	17,566,100	17,540,000	16,117,000
2	Victualling and Clothing for the Navy	6,164,430	5,323,000	4,421,000
3	Medical Establishments and Services	672,700	597,000	441,000
4	Fleet Air Arm	—	—	5,718,000
5	Educational Services	309,840	231,000	223,600
6	Scientific Services	932,920	775,000	656,000
7	Royal Naval Reserves	472,870	472,700	355,800
8	Shipbuilding, Repairs, Maintenance, etc.: Section I.— <i>Personnel</i>	10,510,100	10,426,000	10,121,400
	Section II.— <i>Matériel</i>	16,761,500	6,057,500	10,625,400
	Section III.—Contract Work	57,577,709	7,355,000	21,455,300
9	Naval Armaments	17,740,500	3,054,000	10,486,500
10	Works, Buildings, and Repairs at Home and Abroad	9,433,000	2,265,000	2,317,000
11	Miscellaneous Effective Services	3,630,360	3,516,800	1,680,300
12	Admiralty Office	1,752,860	1,735,500	1,602,500
	Total Effective Services	£ 143,524,889	59,349,000	86,220,800
	III.—NON-EFFECTIVE SERVICES.			
13	Non-Effective Services (Naval and Marine)—Officers	3,022,902	3,008,000	3,049,000
14	Non-Effective Services (Naval and Marine)—Men	5,736,580	5,662,400	5,485,500
15	Civil Superannuation, Allowances, and Gratuities	1,382,310	1,379,600	1,362,200
	Total Non-Effective Services	£ 10,141,792	10,050,000	9,896,700
	GRAND TOTAL	£ 153,666,681	69,399,000†	96,117,500
NET DECREASE†		£26,718,500.		

ADMIRALTY.
15 Feb., 1939.

{ STANHOPE,
ROGER BACKHOUSE,
CHARLES LITTLE,

R. G. H. HENDERSON, G. H. SHAKESPEARE,
G. S. ARBUTHNOT, J. J. LLEWELLIN,
A. R. M. RAMSAY, R. H. A. CARTER.
A. B. CUNNINGHAM,

† The Appropriation-in-Aid under Vote 8, Sections II and III, Vote 9 and Vote 10 include sums aggregating £80,000,000 to be provided by issues from the Consolidated Fund, subject to statutory authority being obtained, as proposed in the Resolution now before Parliament, for an increase in the amount at present authorized to be so issued under the Defence Loans Act, 1937 (1 Edw. 8 and 1 Geo. 6, c. 13). The net total of Navy Estimates before deducting sums to be issued from this source is £149,399,000. The comparable figures in Navy Estimates 1938, were £30,000,000 and £126,117,500 respectively.

STATEMENT SHOWING THE NUMBERS BORNE, THE EXPENDITURE ON NAVAL SERVICES FOR THE YEARS 1919 TO 1937, AND THE ESTIMATES FOR 1938 AND 1939.

YEAR	VOTE A. Average numbers borne, (a)	VOTE 1. — Wages, &c. of Officers, &c.		VOTE 2. — Vital- ling and Clothing.		VOTE 3. — Medical Establish- ments, &c.		VOTE 4. — Civilian employed in Fleet Service		VOTE 5. — Educa- tional Services.		VOTE 6. — Scientific Services.		VOTE 7. — Royal Naval Reserves		VOTE 8. Shipbuilding, Repair, Maintenance, &c.			VOTE 9. Naval Arma- ments.		VOTE 10. Works.		VOTE 11. Miscel- laneous.		VOTE 12. Admiralty Office.		VOTE 12. Half Pay, &c.		VOTE 13. Naval, &c. Pensions.		VOTE 15. Civil Superannua- tion, &c.		Balances Irrecover- able.	Total Expenditure				
		£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£						
1919	176,087	32,385,806	8,823,106	783,046	556,778	401,864	384,832	458,044	12,426,177	785,296	48,348,933	14,441,835	5,595,608	11,118,631	2,042,715	1,176,987	15,133,064	802,279	60,875	154,084,044																		
1920	124,009	21,314,360	8,311,708	683,830	759,110	503,152	249,185	359,694	12,096,747	7,799,966	12,001,445	8,493,951	4,992,969	5,724,974	2,078,764	2,352,844	4,847,475	880,998	23,611	92,505,290																		
1921	127,180	19,220,859	6,831,481	643,785	480,243	405,592	359,575	423,056	10,690,188	8,835,771	4,834,336	6,253,468	4,746,485	5,606,514	1,780,941	2,002,291	3,881,368	1,020,693	69,985	75,986,141																		
1922	107,782	15,762,232	4,767,118	492,419	258,600	382,065	354,961	423,722	7,075,533	3,877,716	3,225,598	3,678,783	3,553,831	2,006,219	1,371,961	3,701,964	5,471,088	968,880	29,679	57,492,889																		
1923	99,107	14,175,111	4,153,803	410,842	193,798	330,644	379,489	459,391	6,751,498	5,521,336	4,427,874	3,840,606	3,215,766	982,173	1,247,813	2,866,704	4,260,245	823,340	33,864	54,064,350																		
1924	99,453	14,150,863	4,152,902	442,756	190,689	334,648	393,054	446,902	7,489,659	5,592,183	5,415,210	3,507,190	3,140,887	1,065,809	1,349,519	2,868,798	4,338,526	811,797	12,355	55,693,787																		
1925	100,284	14,576,499	4,226,570	440,209	1,320,000	327,226	417,552	465,114	7,929,259	6,906,184	6,396,408	4,247,113	2,422,050	826,119	1,307,790	2,812,388	4,449,585	928,326	8,110	60,004,548																		
1926	100,791	14,322,678	4,236,846	434,919	681,000	324,036	398,339	444,759	7,487,952	5,425,141	7,275,173	3,595,037	2,108,441	930,369	1,293,639	2,914,419	4,450,140	894,472	23,002	57,142,862																		
1927	101,916	14,598,462	4,182,491	423,777	882,000	224,384	402,976	419,086	7,087,419	4,678,052	8,839,423	3,696,749	1,900,788	844,852	1,233,182	2,906,485	4,525,853	965,602	2,276	58,123,257																		
1928	100,680	14,435,347	3,992,639	418,863	1,008,800	226,486	396,298	403,295	6,743,571	5,074,290	8,263,060	3,871,235	1,960,307	728,841	1,181,125	3,006,321	4,496,310	944,735	4,223	57,139,146																		
1929	99,300	14,286,313	3,840,068	419,371	1,066,000	226,449	467,343	387,241	6,561,827	4,977,230	7,291,217	3,868,359	2,079,775	725,511	1,194,842	3,075,846	4,550,155	968,944	1,239	56,987,770																		
1930	94,921	13,996,225	3,531,280	394,506	1,267,000	224,722	470,965	395,648	6,227,647	4,198,563	5,632,728	3,557,624	1,928,639	667,107	1,178,675	3,121,672	4,592,970	983,198	5,083	52,274,186																		
1931	92,449	13,482,777	3,146,731	379,239	1,126,000	219,367	451,498	394,007	6,331,341	4,517,054	4,717,751	3,326,274	2,399,570	683,774	1,114,266	3,123,312	4,625,833	1,026,306	652	51,014,752																		
1932	89,667	12,636,077	2,980,931	361,229	1,025,000	207,142	463,149	346,552	6,262,431	4,190,785	5,429,049	3,818,886	2,374,150	562,029	1,066,182	3,125,419	4,741,854	1,060,332	2,455	50,164,453																		
1933	89,843	12,614,488	3,182,430	376,228	1,089,000	194,742	454,819	373,092	6,192,587	4,751,666	7,995,227	3,767,356	2,243,544	572,722	1,079,214	3,281,172	4,587,822	1,055,710	1,707	53,448,545																		
1934	91,351	12,689,561	3,146,079	366,069	1,338,000	194,079	455,883	342,052	6,527,160	4,783,966	9,498,087	4,084,459	2,068,310	553,411	1,105,578	3,260,397	4,806,397	1,122,970	1,194	56,616,010																		
1935	94,259	13,139,921	3,434,985	405,768	1,983,000	198,962	465,666	331,151	7,173,391	6,451,208	12,159,366	5,657,513	2,050,925	789,112	1,156,355	3,149,493	5,101,079	1,173,312	22,316	64,887,613																		
1936	90,896	13,093,059	3,575,440	399,872	3,572,000	205,873	498,176	329,978	8,092,951	9,225,301	17,850,481	8,628,627	2,082,290	846,964	1,306,636	3,159,145	5,262,135	1,220,047	9,068	80,976,124																		
1937	107,040	13,969,765	4,309,994	416,846	4,200,000	213,931	536,625	351,726	8,966,605	6,653,037	13,746,314	7,564,082	1,757,867	904,957	1,491,560	3,135,380	5,389,047	1,252,982	1,619	77,892,397																		
1938 (estimate)	146,500(b)	16,117,000	4,421,000	441,000	5,718,000	223,600	656,000	355,800	10,121,400	10,625,400	21,455,300	10,466,500	2,317,000	1,680,300	1,602,500	3,049,000	5,485,500	1,362,200	—	96,117,500																		
1939 (estimate)	133,000(b)	17,540,000	5,323,000	597,000	—	231,000	775,000	472,700	10,426,000	6,057,500	7,355,000	3,054,000	2,265,000	3,516,500	1,735,500	3,008,000	5,662,400	1,371,600	—	99,399,000†																		

Note.—The figures for Expenditure represent the Net Expenditure after taking into account receipts noted in the Navy Appropriation Accounts as receipts in excess of estimated Appropriations in Aid.

(a) Exclusive of Royal Marine Police.

(b) Maximum bearing.

† See note † on previous page.

EXPENDITURE FOR NAVAL PURPOSES OF THE PRINCIPAL FOREIGN POWERS.

UNITED STATES NAVY.

Summary of estimates of appropriations for the fiscal year 1939, compared with the fiscal year 1938.

Bureau or subdivision.	Appropriations 1939.	Appropriations 1938.
Bureau of Aeronautics	\$48,349,600	\$44,558,800
Marine Corps	27,696,830	27,668,590
Replacement Navy, Construction and Machinery	131,063,150	117,363,150
Armour and Armament	23,050,000	20,700,000
Bureau of Supplies and Accounts	222,307,350	224,811,350
Bureau of Medicine and Surgery	2,637,580	2,637,580
Bureau of Yards and Docks	36,025,600	19,613,600
Bureau of Engineering	26,694,400	24,944,400
Bureau of Construction and Repair	23,642,069	21,892,069
Bureau of Ordnance	26,998,600	26,998,600
Bureau of Navigation	14,174,935	14,174,935
Hydrographic Office, Navy Department	534,020	534,020
Naval Observatory	198,120	198,120
Office of Naval Records	46,080	46,080
Office of Judge Advocate-General	122,000	122,000
Office of Chief of Naval Operations	72,660	72,660
Office of Director of Naval Communications	135,200	135,200
Office of Naval Intelligence	79,180	79,180
Board of Inspection and Survey	19,840	19,840
Office of the Secretary	2,625,330	2,625,330
Total Trust Funds	2,235,000	1,523,000
Reappropriation	—	—
TOTAL	588,707,544	550,718,494

FRENCH NAVY.

ESTIMATES, 1939.

The figures for 1939, as compared with those for 1938 are as follows :—

	1939. <i>Francs.</i>	1938. <i>Francs.</i>
Ordinary (i.e. Maintenance)	2671,878,877	2190,759,986
Extraordinary (i.e. New Construction and Works)	5400,000,000	2460,000,000
TOTAL	8071,878,877	4650,759,936

The principal items included in the extraordinary vote are :—

New Construction salaries	127,200,957	127,285,000
New construction by dockyards (material)	706,910,180	434,999,000
New construction by Private Firms	2181,428,955	846,999,900
Naval Ordnance (material)	922,782,880	498,000,000
Naval Ordnance (Salaries)	57,627,000	57,500,000
Torpedoes and mines	220,728,372	98,000,000

ROYAL ITALIAN NAVY.

ESTIMATES, 1939-1940.

	1939-40. <i>Lira.</i>	1938-39. <i>Lira.</i>
TOTAL	2,703,657,809	2,013,000,000
The principal construction items are :—		
New Construction	Not yet	603,000,000
Maintenance and Repairs	known.	145,500,000

JAPANESE NAVY.

ESTIMATES, 1938-39.

	1938-39. <i>Yen.</i>	1937-38. <i>Yen.</i>
Ordinary	293,400,000	274,000,000
Extraordinary	384,000,000	514,000,000
TOTAL	677,400,000	788,000,000

No official figures are published for the German Naval Estimates.

BRITISH AND FOREIGN NAVIES.

PRINCIPAL OFFICIALS.

GREAT BRITAIN.

First Lord.—The Right Honourable Earl Stanhope, K.G., D.S.O., M.C., D.L.
First Sea Lord and Chief of Naval Staff.—Admiral Sir Roger R. C. Backhouse, G.C.B., G.C.V.O., C.M.G.
Second Sea Lord and Chief of Naval Personnel.—Admiral Sir Charles Little, K.C.B.
Third Sea Lord and Controller.—Rear-Admiral B. A. Fraser, C.B., O.B.E.
Fourth Sea Lord and Chief of Supplies and Transport.—Rear-Admiral Geoffrey S. Arbuthnot, C.B., D.S.O.
Fifth Sea Lord and Chief of Naval Air Services.—Vice-Admiral the Honourable Sir Alexander R. M. Ramsay, G.C.V.O., K.C.B., D.S.O.
Deputy Chief of Naval Staff.—Vice-Admiral Sir Andrew B. Cunningham, K.C.B., D.S.O.
Parliamentary and Financial Secretary.—Geoffrey Shakespeare, Esq., M.P.
Civil Lord.—Colonel J. J. Llewellyn, O.B.E., M.C., T.D., M.P.
Permanent Secretary.—Sir Richard Henry Archibald Carter, K.C.B., K.C.I.E.

FOREIGN POWERS.

Country.	Minister of Marine.	Chief of Staff.
Albania	Captain Maro Salvestroni (Head of the Navy)	—
Argentina	Vice-Admiral León Seassó	—
Brazil	Vice-Admiral Henrique Aristides Gullenhem	Vice-Admiral J. M. Castro e Silva
Chile	Don Emilio Bello Codecido (Minister of National Defence), Vice-Admiral Julio Allard (Director General of the Navy)	—
China	Admiral Chen Shao-Kwan (Minister of Naval Affairs)	Vice-Admiral Chen Hsien-Yung (Vice Minister)
Colombia	—	Rear-Admiral B. O. Bell-Salter (Capt. R.N. Retired), Commander-in-Chief
Cuba	—	—
Denmark	Vice-Admiral H. Rechinitzer (Chief of Naval Defence and Director of the Naval Ministry)	Kommandor C. Hammerich
Ecuador	Colonel Benigno Andrade Flores (Minister of Defence)	General Enrique Bariga (Commanding Naval Forces)
Estonia	General Lill (Minister of Defence)	General N. Reck
Finland	J. Niukkanen (Minister of Defence)	Rear-Admiral Lundmann
France	Mon. Cesar Campinchi	Vice-Admiral J. L. X. F. Darlan.
Germany	Herr Adolf Hitler (Supreme Commander of the Armed Forces)	General-Admiral Dr. Raeder (Commander-in-Chief of the Navy)
Greece	J. Paparassiliou	Rear-Admiral A. Sakellariou
Hungary	Rear-Admiral O. R. Wulff (Inspector General)	—
Italy	Signor Benito Mussolini	Ammiraglio di Armata D. Cavagnari
Japan	Vice-Admiral Mitsumaru Yonai, C.M.G.	H.I.H. Prince Hiroyasu Fushimi, G.C.V.O.
Latvia	General Balodis (Minister of War)	Captain Spade (Chief of Naval Forces)
Lithuania	Colonel Stasys Dirnantas (Minister of National Defence)	—
Mexico	General Quiroga (Minister of War and Marine)	Rear-Admiral O. P. Blanco
Netherlands	Mon. Van Dijk (Minister of Defence)	Vice-Admiral J. T. Fürstner
Norway	C. F. Monsen (Minister of Defence)	Rear-Admiral H. E. Diesen (C.-in-C.)
Paraguay	Commander D. Manuel Aponte (Director of Marine Dept.)	Lieut.-Commander Ramon Martino (Director General of the Navy)
Peru	Captain Roque Saldias (Minister of Marine and Aviation)	Captain Fredrico Diaz Dulantó
Poland	Marshal Smigley-Rydz	Rear-Admiral J. Swirski (Chief of Navy Dept.)
Portugal	Lieut.-Commander M. O. Bettencourt	Rear-Admiral Antonio R. Ortigao
Rumania	—	Captain I. Georgescu
Siam	Luang Bipul (Minister of Defence)	Eng.-Captain Phya Vicharn Chakrakhich (C.-in-C.)
Soviet Union	M. Frimovsky (People's Commissar)	Flagman L. M. Galler
Spain	—	Admiral Cervera (Insurgent)
		Captain Luis Ubieta (C.-in-C. Government)

Country	Minister of Marine	Chief of Staff
Sweden . . .	Janne Nilsson (Minister of Defence)	Rear-Admiral Countie Ehrensvärd
Turkey . . .	Captain Hümiü Kokdenizer (Under-Secretary for the Navy)	Captain Safyeddin Dagada
United States .	C. Swanson (Secretary of the Navy)	Admiral W. D. Leahy (Chief of Naval Operations)
Uruguay . . .	General Domingo Mendivil (Minister of War and Marine)	Captain Gustavo Schroeder (Inspector General of Marine)
Venezuela . .	Commander Lavazaval (Head of the Navy)	—
Yugoslavia . .	Army General Lj M. Marió (Army and Navy Ministry)	Rear-Admiral V. P. Marijasević

BRITISH AND FOREIGN NAVAL ATTACHÉS.

BRITISH NAVAL ATTACHÉS ACCREDITED TO FOREIGN COUNTRIES.

To :—

Albania and Italy : Captain Sir Philip W. Bowyer-Smith, Bt., R.N. (appointed 23rd January, 1939) ; Headquarters, Rome, Italy.
 Belgium, France, Spain, and Netherlands : Captain C. S. Holland, R.N. (appointed 17th January, 1938) ; Headquarters, Paris, France.
 Brazil, Argentine, Uruguay : Captain H. W. U. McCall, R.N. (appointed 12th November, 1938) ; Headquarters, Buenos Ayres, Brazil.
 Chile, Ecuador, Peru : Captain S. H. T. Arliss, R.N. (appointed 22nd April, 1938) ; Headquarters, Santiago, Chile.
 Denmark, Germany, Norway, Sweden, Finland, Estonia, Latvia, Lithuania, and Poland : Captain T. H. Troubridge, R.N. (appointed 23rd July, 1936) ; Commander (E.) G. Hearson, R.N. (Assistant, and for duty as Assistant to Naval Attachés, Paris and Rome ; appointed 22nd September, 1937) ; Headquarters, Berlin, Germany.
 Greece, Turkey, and Yugo-Slavia : Captain H. A. Packer, R.N. (appointed 21st January, 1937) ; Headquarters, Athens, Greece.
 Japan and China : Captain D. N. C. Tufnell, D.S.C., R.N. (appointed 31st December 1938) ; Assistant Commander (E.) A. D. Merriman, R.N. (appointed 5th May, 1936) ; Headquarters, Tokyo, Japan.
 Portugal : Commander H. D. Owen (appointed 8th October, 1938) ; Headquarters, Lisbon, Portugal.
 Siam : Commander L. N. Brownfield, R.N. (appointed 11th January, 1939) ; Headquarters, H.M.S. " Terror " II (Bangkok, Siam).
 Soviet Union, Rumania, and Bulgaria : Captain H. Clanchy, R.N. (appointed 24th October, 1936) ; Headquarters, Moscow, U.S.S.R.
 U.S.A., Mexico, Panama, and Cuba : Captain L. C. A. St. J. Curzon-Howe, M.V.O., R.N. (appointed 28th May, 1938) ; Assistant Commander (E.) F. J. A. Coleby, R.N. (appointed 1st October, 1937) ; Headquarters, Washington, U.S.A.

FOREIGN NAVAL ATTACHÉS ACCREDITED TO GREAT BRITAIN.

From :—

Argentina : Captain José S. Zuloaga.
 Brazil : Engineer-Captain Natal Arnaud.
 Chile : Commander Gerald Trudgett.
 China : Captain Lung Yung Hsien.
 Finland : Commander Holger Gröndahl.
 France : Captain C. L. M. C. Denis de Rivoyre ; Lieut. L. Bedin (Assistant Naval Attaché).
 Germany : Kapitän zur See W. Siemens.
 Italy : Contrammiraglio Bruno Brivonesi ; Engineer-Lieutenant Ernesto Trenchi (Assistant).
 Japan : Captain Hideo Yano ; Commander S. Ashina (Assistant).
 Netherlands : Lieut.-Commander A. de Booy.
 Rumania : Captain Gheorghe St. Dunsitrescu ; Captain Cezar Mainescu (Assistant).
 Siam : Colonel Mom Snidvongse Seni.
 Soviet Union : Engineer Flagman L. V. Antsipo-Chikunski.
 Sweden : Kom-Kapten G. E. F. Boldt-Christmas.
 Turkey : Commander Siret Cakir.
 United States : Captain R. Wilson ; Captain J. A. Fiver (C.C.) (Assistant).
 Yugo-Slavia : Colonel Dragontine P. Savitch.

BRITISH SHIPBUILDING FIRMS.

THE firms listed below all undertake the building of merchant vessels. Those which undertake in addition the construction of (a) Men-of-war, (b) Propelling machinery and (c) Auxiliary machinery for ships, are so distinguished.

- Ailsa Shipbuilding Co., Ltd., Troon, Ayrshire. (a) (b)
 Ardrossan Dockyard, Ltd., Ardrossan, Ayrshire.
 S. P. Austin and Son, Ltd., Wear Dock Yard, Sunderland. (a)
 Barclay, Curle and Co., Ltd., Whiteinch, Glasgow. (a) (b)
 Bartram and Sons, Ltd., South Dock, Sunderland.
 George Brown and Co., Greenock.
 John Brown and Co., Clydebank. (a) (b)
 Burntisland Shipbuilding Co., Ltd., Burntisland.
 Caledon Shipbuilding and Engineering Co., Ltd., Dundee. (a) (b)
 Cammell Laird and Co., Ltd., Birkenhead. (a) (b) (c)
 Cochrane and Sons, Ltd., Selby, Yorks.
 William Denny and Brothers, Ltd., Dumbarton. (a) (b)
 William Doxford and Sons, Ltd., Sunderland. (a) (b)
 Fairfield Shipbuilding and Engineering Co., Ltd., Govan, Glasgow.
 (a) (b)
 Ferguson Brothers (Port Glasgow), Ltd., Port Glasgow. (a) (b) (c)
 Fleming and Ferguson, Ltd., Paisley. (b)
 Furness Shipbuilding Co., Ltd., Haverton-on-Tees.
 Goole Shipbuilding and Repairing Co., Ltd., Goole. (a)
 Grangemouth Dockyard Co., Ltd., Grangemouth.
 William Gray and Co., Ltd., West Hartlepool. (a) (b) (c)
 Greenock Dockyard Co., Ltd., Greenock.
 Hall, Russell and Co., Ltd., Aberdeen. (b)
 William Hamilton and Co., Ltd., Port Glasgow. (a)
 Harland and Wolff, Ltd., Belfast and Govan, Glasgow. (a) (b) (c)
 R. and W. Hawthorn, Leslie and Co., Ltd., Newcastle-on-Tyne.
 (a) (b) (c)
 Charles Hill and Sons, Ltd., Bristol.
 A. and J. Inglis, Ltd., Pointhouse, Glasgow. (a)
 Irvine's Shipbuilding and Dry Docks Co., Ltd., Hartlepool. (c)
 Sir James Laing and Sons, Ltd., Sunderland.
 John Lewis and Sons, Ltd., Aberdeen. (b)
 Lytham Shipbuilding and Engineering Co., Ltd., Lytham, Lancs.
 (a) (b)
 Philip and Son, Ltd., Dartmouth. (a) (b)
 Sir John Priestman and Co., Sunderland.
 John Readhead and Sons, Ltd., South Shields. (b)

Henry Robb, Ltd., Leith. (a)
 Rose Street Foundry and Engineering Co., Ltd., Inverness. (b) (c)
 Scott and Sons, Bowling, near Glasgow.
 Scotts' Shipbuilding and Engineering Co., Ltd., Greenock. (a) (b)
 Short Brothers, Ltd., Sunderland.
 William Simons and Co., Ltd., Renfrew, near Glasgow. (a) (b)
 Smith's Dock Co., Ltd., North Shields. (b)
 Alexander Stephen and Sons, Ltd., Linthouse, Govan, Glasgow. (a)
 Swan, Hunter and Wigham Richardson, Ltd., Wallsend-on-Tyne.
 (a) (b) (c)
 Joseph L. Thompson and Sons, Ltd., Sunderland.
 John I. Thornycroft and Co., Ltd., Woolston, Southampton. (a)
 (b) (c)
 Vickers-Armstrongs, Ltd., Barrow-in-Furness and High Walker,
 Newcastle-on-Tyne. (a) (b) (c)
 J. Samuel White and Co., Ltd., Cowes, Isle of Wight. (a) (b) (c)
 Wood, Skinner and Co., Ltd., Bill Quay, Pelaw, Co. Durham.
 Yarrow and Co., Ltd., Scotstoun, Glasgow. (a) (b) (c)

BOAT-BUILDERS.

In addition to the shipbuilding firms listed above, the following firms undertake the construction of men-of-war's boats or power-driven boats for combatant purposes.

Aldous Successors, Ltd., Brightlingsea, Essex.
 Boats and Cars (Kingston), Ltd., Kingston-on-Thames.
 British Power Boat Company, Hythe, Southampton.
 Brooke Motor Craft Co., Ltd., Harbour Road, Oulton Broad,
 Lowestoft.
 Camper and Nicholson, Gosport.
 Clare Lallow, Cowes, Isle of Wight.
 Walter Cook, Maldon, Essex.
 Groves and Guttridge, Clarence Road, Cowes, Isle of Wight.
 Hamble River Yacht and Engineering Co., Swanwick Shore, near
 Southampton. (Now owned by Solent Shipyard Co., Ltd.,
 Bursledon, Hants.)
 Hugh McLean and Sons, Ferry Road, Renfrew.
 Mechans, Ltd., Scotstoun Ironworks, Glasgow.
 Medway Yacht Basin, Rochester.
 J. H. Pounder and Co., Throston Bridge, Hartlepool.
 Rowhedge Ironworks, Ltd., Rowhedge, near Colchester.
 A. Rutherford and Co., Ltd., Birkenhead.
 Saunders Roe, Ltd., Cowes, Isle of Wight.
 Sittingbourne Shipbuilding Co., Ltd., 97, Park Road, Sittingbourne,
 Kent.
 J. Taylor (Chertsey), Ltd., Chertsey, Surrey.
 Vosper, Ltd., Portsmouth.
 White's Southampton Yachtbuilding and Engineering Co., Ltd.,
 Itchen, Southampton.

FIRMS MANUFACTURING MILITARY AIRCRAFT.

The following are the principal constructors of military aircraft :

- Aeronautical Corporation of Great Britain, Walton Works, Peterborough.
 Airspeed (1934), Ltd., The Airport, Portsmouth, Hants.
 Sir W. G. Armstrong Whitworth Aircraft, Ltd., Whitley, near Coventry.
 Blackburn Aircraft, Ltd., Brough, E. Yorks.
 Boulton Paul Aircraft, Ltd., The Airport, Wolverhampton.
 Bristol Aeroplane Co., Ltd., Filton, Bristol.
 British Aircraft Manufacturing Co., Ltd., Hanworth Aerodrome, Middlesex.
 Cierva Autogiro Co., Ltd., Bush House, W.C.2.
 De Havilland Aircraft Co., Ltd., Hatfield Aerodrome, Hertfordshire.
 Fairey Aviation Co., Ltd., Hayes, Middlesex.
 General Aircraft, Ltd., London Air Park, Feltham.
 The Gloster Aircraft Co., Ltd., 3, St. James's Square, S.W.1.
 Handley Page, Ltd., 40, Claremont Road, Cricklewood, N.W.2.
 Hawker Aircraft, Ltd., Canbury Park Road, Kingston-on-Thames.
 Heston Aircraft Co., Ltd., Heston Airport, Hounslow.
 Parnall Aircraft Co., Ltd., Yate, Bristol.
 Percival Aircraft, Ltd., 20 Grosvenor Place, S.W.1.
 Phillips and Powis Aircraft, Ltd., Reading Aerodrome, Woodley Reading.
 A. V. Roe and Co., Ltd., Newton Heath, Manchester.
 Saunders-Roe, Ltd., East Cowes, Isle of Wight.
 Short Bros. (Rochester and Bedford), Ltd., Rochester, Kent.
 Supermarine Aviation Works (Vickers), Ltd., Vickers House Broadway, Westminster, S.W.1.
 Vickers (Aviation), Ltd., Weybridge, Surrey.
 Westland Aircraft, Ltd., Yeovil, Somerset.

**PROFILES OF
BRITISH AND FOREIGN WARSHIPS**

CAPITAL SHIPS.

[In order to facilitate identification, the ships are arranged in accordance with the number of funnels and masts, as these are the features most easily distinguished at a distance. Dimensions and particulars of British and foreign warships will be found on pp. 225-270. All the profiles are drawn to the scale $\frac{1}{2}$ in. = 100 ft.]

[Indexes to the names of vessels of which profiles are included in this section are given at the end of the volume.]



SWEDEN. Battleship. Oscar II.
(A searchlight is fitted on each mast.)



GREAT BRITAIN. Battle-cruiser. Hood.
(Fore topgallant mast has been added and bridge structure modified.)



GREAT BRITAIN. Battle-cruiser. Repulse (after reconstruction 1936).
Renown now undergoing reconstruction will be similar.
Fore topmast removed.



JAPAN. Battleships. Mutsu, Nagato.
Single funnel fitted and catapult added between mainmast and "X" turret.
Superstructure built round mainmast.
Bridgework modified.
Main topgallant mast removed.

**JAPAN. Battleships. Ise, Hyuga.**

Fore funnel and topmast removed.
 Bridgework modified.
 Superstructure built round mainmast.
 Main topgallant mast removed.

**JAPAN. Battleships. Haruna, Kirishima, Kongo**

Haruna and Kongo have funnels of equal height.
 Derricks fitted between X and Y turrets.

**CHILE. Battleship. Almirante Latorre.**

(Modernised 1931—mainmast raised and bridge work altered.)
 Catapult fitted on quarter deck.

**UNITED STATES. Battleships. California, Colorado, Maryland, Tennessee, West Virginia.**

(Now fitted with 2 catapults, one on "X" turret and one on the quarter deck.)
 Crane fitted at stern.
 Maryland has range-finder fitted on B turret.

**ITALY. Battleships. Andrea Doria, Carlo D'Amico.**

Being modernised as Cavour and Cesare.



ITALY. Battleships. Conte di Cavour, Giulio Cesare.



UNITED STATES. Battleship. Arkansas.



ARGENTINE. Battleships. Moreno, Rivadavia.
Guns on B and X turrets replaced by range-finders.



FRANCE. Battleships. Bretagne, Lorraine, Provence.

NOTE.—Lorraine has been modernised. The midships turret has been removed and replaced by a hangar and catapult. Cranes fitted abreast after funnel. Bridgework extended. Fore topmasts removed, main topmasts fitted.



FRANCE. Battleships. Courbet, Paris.
Cranes fitted abreast after funnel.
After funnel reduced in height.



BRAZIL. Battleships. Minas Geraes, São Paulo.
 Minas Geraes has forward funnel removed and bridgework modified.
 Remaining funnel made larger.



SOVIET UNION. Battleships. Marat, Paris Commune and October Revolution.
 Two derricks fitted between mainmast and turret in Marat and Paris Commune.
 Crane fitted abreast mainmast in October Revolution.



TURKEY. Battle-cruiser. Yavouz Sultan Selim.



GREAT BRITAIN. Battleships. Nelson, Rodney.
 Nelson has a crane amidships.
 Rodney has a catapult fitted on C turret.
 Mast structure increased.



FRANCE. Battleships. Dunkerque, Strasbourg.
 Catapult fitted on quarter deck. Crane is moved aft to break of deck.
 Main topgallant mast fitted.



JAPAN. Battleships. Fuzo and Yamashiro.
(After reconstruction, 1934.)



GREAT BRITAIN. Battleships. Barham, Malaya.
NOTE.—Barham has tripod mainmast and catapult on "X" turret.
Barham and Malaya have tall mainmasts and no fore topmasts.
Malaya has catapult before mainmast; Derrick on mainmast removed; Hangar
and cranes fitted abreast funnel.
Sternwalk fitted in Barham.



GREAT BRITAIN. Battleships. Warspite, Queen Elizabeth, Valiant.
NOTE.—Queen Elizabeth and Valiant have tripod foremasts and are under
reconstruction.
Sternwalks fitted in Warspite and Queen Elizabeth.



UNITED STATES. Battleships. New York, Texas.
Fore topmast removed; Mastheads modified and fitted with machine-guns.
Range-finder fitted on B and X turrets.



**GREAT BRITAIN. Battleships. Ramillies, Resolution, Revenge, Royal Oak, Royal
Sovereign.**
NOTE.—Resolution has a smoke deflector on the funnel. Royal Oak, Ramillies and
Resolution have tripod mainmasts, a catapult on "X" turret and a crane
abreast mainmast.
Main topgallant mast fitted.



UNITED STATES. Battleships. Idaho, Mississippi, New Mexico.
(After modernisation, 1934.)



UNITED STATES. Battleships. Arizona, Pennsylvania.
Catapult on "X" turret added. Crane fitted at Stern. Main topmast is on fore side of mast structure.



UNITED STATES. Battleships. Nevada, Oklahoma.
Bridgework extended and mastheads modified.



GERMANY. Armoured Ships. Admiral Scheer, Admiral Graf Spee.
Graf Spee has pole mast abaft tower.



GERMANY. Armoured Ship. Deutschland.
Pole mast fitted on aft side of funnel. Catapult fitted abaft funnel.
Fore topmast fitted.

AIRCRAFT AND SEAPLANE CARRIERS AND TENDERS.



GREAT BRITAIN. Aircraft Carrier. Eagle.
Fore topmast added and mast structure modified.
Signal mast added forward.



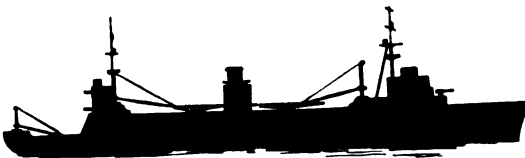
SWEDEN. Aircraft Cruiser. Gotland.



GREAT BRITAIN. Aircraft Carrier. Hermes.
Topmast and signal mast forward added. Flight deck extended aft.



FRANCE. Aircraft Carrier. Béarn.
Space between flight deck and upper deck forward partially blanked off.
Framework fitted on aft side of funnel.



FRANCE. Aviation Transport. Commandant Teste.



ROYAL AUSTRALIAN NAVY. Seaplane Carrier. Albatross.
Catapult fitted forward.



UNITED STATES. Aircraft Carriers. Saratoga, Lexington.
Lexington has platform round top of funnel.



UNITED STATES. Aircraft Carriers. Enterprise, Yorktown.



GREAT BRITAIN. Aircraft Carriers. Courageous, Glorious.

NOTES.—In Glorious the flight deck has been lengthened aft, and now extends to the stern.
The quarter deck has also been raised a deck.
Tripod mast added before funnel.
Three wireless masts added each side of flight deck.
In Courageous the flight deck extends almost to the stern, a tripod mast has been added before funnel, and three wireless masts added each side of flight deck.



GREAT BRITAIN. Aircraft Carrier. Ark Royal.



JAPAN. Aircraft Carrier. Hoshō.
Funnels hinge outboard.



GREAT BRITAIN. Aircraft Carrier. Furious.
Three wireless masts added each side of flight deck.
Quarter deck has been raised one deck.
Platform built on flight deck forward.



JAPAN. Aircraft Carrier. Akagi.
Superstructure added and flight deck extended forward.

AIRCRAFT CARRIERS.



JAPAN. Aircraft Carrier. Kaga.

Superstructure added and flight deck extended forward.



UNITED STATES. Aircraft Carrier Ranger.

(NOTE.—Funnels hinge outboard.)
Signal masts fitted at ends of flight deck.

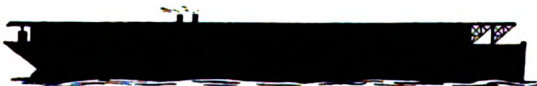


GREAT BRITAIN. Aircraft Carrier. Argus. (Training Ship.)

Flight deck levelled forward.



JAPAN. Aircraft Carrier. Ryujo.



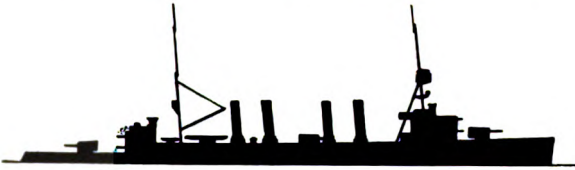
UNITED STATES. Aircraft Tender. Langley.

Foremost third of flight deck removed.
Two pole masts fitted.

CRUISERS AND COAST DEFENCE SHIPS.



JAPAN. Cruisers. ("Sendai" class.) Naka, Sendai, Jintsu.
Catapult fitted abaft mainmast. Aircraft platform forward removed.
The mainmast is of tripod construction and is fitted with a derrick on its after side.



UNITED STATES. Scout Cruisers. ("Omaha" class.) Cincinnati, Concord, Detroit, Marblehead, Memphis, Milwaukee, Omaha, Raleigh, Richmond, Trenton.

(There are small differences in the arrangement of guns aft.)
Topmasts shortened.



JAPAN. Cruisers. ("Chikuma" class.) Hirado, Yahagi. (Training Ships.)



ROYAL AUSTRALIAN NAVY. Cruiser. Adelaide.



ITALY. Armoured Cruiser. (Classified as Battleship, 2nd class, in Italian official lists.) San Giorgio.



ITALY. Light Cruiser. Taranto (ex-German Strassburg).



GREAT BRITAIN. Cruisers. ("London" class.) Devonshire, London, Shropshire, Sussex. ("Norfolk" class.) Dorsetshire, Norfolk. Fore topgallant mast added.



GREAT BRITAIN. Cruisers. ("Kent" class.) Cumberland, Suffolk, Kent, Berwick and Cornwall.

Kent has a sternwalk.

Kent, Berwick and Cornwall are flush-decked.

Royal Australian Navy. Cruisers. "Kent" Class. Australia, Canberra.

No hangars fitted.



GREAT BRITAIN. Cruisers. ("E" class.) Emerald, Enterprise. (In Enterprise the forward 6-in. guns are in a twin mounting on the forecastle deck.)



JAPAN. Light Cruisers. ("Kuma" class.) Kiso, Kitakami, Kuma, Oi, Tama. ("Natori" class.) Isuzu, Natori, Nagara, Yura, Kinu, Abukuma.

Catapult fitted before mainmast. The mainmast is of tripod construction and is fitted with a derrick on its fore side.



SOVIET UNION. Cruisers. Proflintern, Chervonnaya, Ukraina.



JAPAN. Light Cruisers. ("Tenryu" class.) Tatsuta, Tenryu.



SPAIN. Light Cruiser. Mendez Nuñez.
Foremast is tripod. Fore topgallant mast added.
A.A. armament fitted between second funnel and mainmast.
Searchlight platform fitted round after funnel.



SPAIN. Light Cruiser. Navarra (Ex Republica).
One funnel and masts removed. Tower built forward and superstructure aft.
Upper deck extends further aft. Another gun added forward.
A.A. armament fitted amidships.



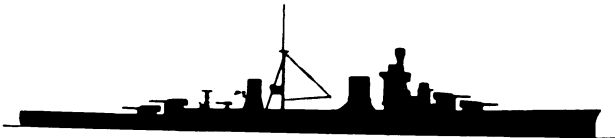
ITALY. Scout Cruiser. Quarto.



JAPAN. Cruisers. ("Nachi" class.) Nachi, Myoko, Ashigara, Haguro.
Catapult fitted abaft mainmast.

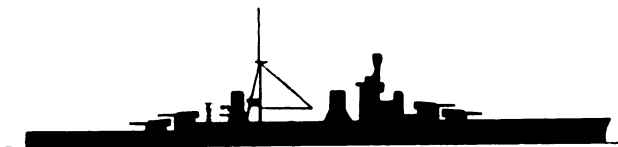


JAPAN. Cruisers. ("Takao" class.) Takao, Atago, Chokai, Maya.



ITALY. Cruiser. (Modified "Trento" class.) Bolzano.
Forward superstructure faired into funnel. Catapult fitted amidships.
Clinker screens fitted to funnels.

CRUISERS.



ITALY. Cruisers. ("Zara" class.) Pola, Zara, Fiume, Gortzia.
Forward superstructure faired into funnel. Catapult fitted forward.
Clinker screens fitted to funnels.



JAPAN. Cruisers. ("Furutaka" class.) Furutaka, Kato.
The tops of the funnels are square to the funnels.
Pole mast raked.



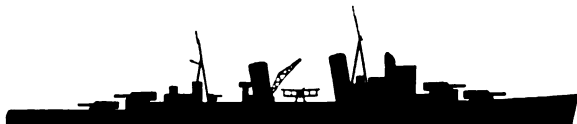
JAPAN. Cruisers. ("Furutaka" class.) Aoba, Kinugasa.
The tops of the funnels are square to the funnels.
Pole mast raked.



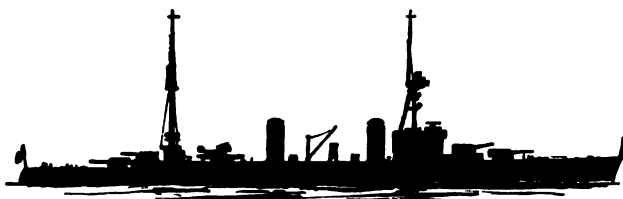
GREAT BRITAIN. Cruisers. (Improved "Birmingham" class.) Eppingham, Frobisher, Hawkins, Vindictive.
Vindictive is used as a training ship, the raised gun forward is removed and a hangar fitted forward of the bridge. Seaplane crane fitted aft of mainmast.
Eppingham, Hawkins and Frobisher are being rearmed, the after funnel being removed. Crane fitted amidships and another gun added forward and aft.



GREAT BRITAIN. Cruisers. (Improved "Southampton" Class.) Belfast, Edinburgh.



GREAT BRITAIN. Cruisers. ("Southampton" Class.) Southampton, Newcastle, Sheffield, Birmingham, Glasgow, Gloucester, Liverpool, Manchester.



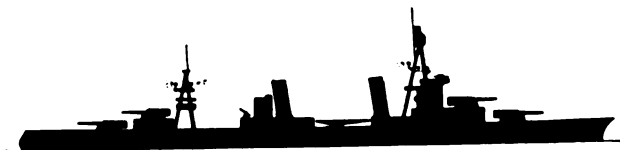
FRANCE. Cruisers. ("Duquesne" class.) Duquesne, Tourville. **("Suffren" class.)** Suffren, Colbert, Foch, Duplex.
(Colbert, Duplex and Foch have tripod mainmasts and the catapults between the funnels.)
Fore topmast shortened in Foch, Duquesne and Tourville and removed in Duplex.



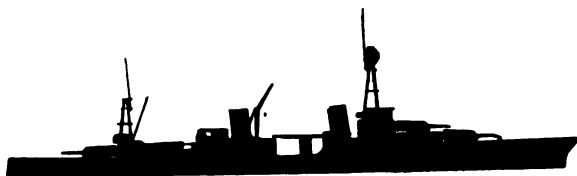
UNITED STATES. Cruisers. ("Astoria" class.) Astoria, New Orleans, Minneapolis, San Francisco, Tuscaloosa.



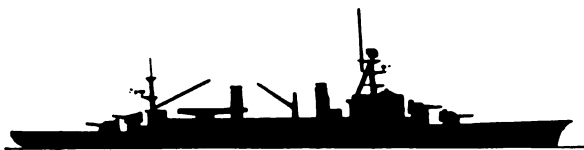
UNITED STATES. Cruisers. Portland and Indianapolis.
Foremost funnel and fore topmast are raised.



UNITED STATES. Cruisers. ("Pensacola" class.) Salt Lake City, Pensacola.
Crane fitted on fore side of after funnel and derricks on after side.



UNITED STATES. Cruisers. ("Chester" class.) Northampton, Chester, Louisville.
("Augusta" class.) Chicago, Houston, Augusta.
Foremost funnel raised and fore topmast shortened in Chester, Louisville and Northampton. Fore topmast shortened.



FRANCE. Training Cruiser. Ocean (Ex Jeanne d'Arc).
(The catapults and fore topmast are removed.)



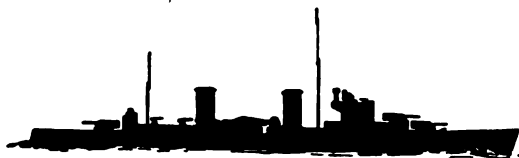
FRANCE. Cruisers. Jean-de-Vienne, La Galissonnière, Marcellaise, Gloire, Montcalm, Georges Leygues.



GREAT BRITAIN. Cruisers. York and Exeter. ("York" class.)
(In Exeter the funnels and masts are vertical.)
Forward funnel has been modified.



GREAT BRITAIN. Cruisers. ("Amphiion" class.) Amphiion, Apollo,
COMMONWEALTH OF AUSTRALIA. ("Amphiion" Class.) Sydney.



GREAT BRITAIN. Cruisers. ("Arethusa" class.) Arethusa, Galatea, Penelope,
Aurora.
Derrick fitted on aft side of after funnel.



GERMANY. Light Cruisers. Köln, Karlsruhe, Königsberg.
Polemast fitted on aft side of after funnel. Catapult fitted between funnels.



FRANCE. Cruiser Minelayer. Emile Bertin.
 Derrick fitted on fore side of Catapult.
 Searchlight platform built round after funnel.
 Small mast fitted on fore side of after turret.



ITALY. Cruisers. ("Condottieri" class.) Montecuccoli, Muzio Attendolo.



ITALY. Cruisers. ("Attendolo" class.) Eugenio di Savoia, Filiberto Duca d'Aosta.



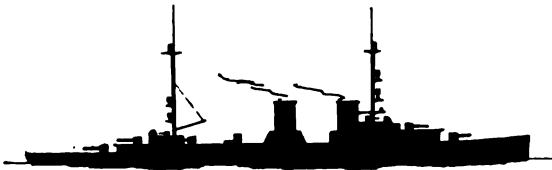
ITALY. Cruisers. ("Condottieri" class.) Alberico de Barbiano, Alberto di Giussano, Bartolomeo Colleoni, Giovanni della Bande Nere.
 Fore topmast and stays to mainmast removed.
 Derrick fitted on fore side of mainmast. Bridgework extended.



ITALY. Cruisers. "Condottieri" class.) Armande Diaz, Luigi Cadorna.
 Fore topmast removed. Catapult fitted between after funnel and "X" turret.
 Derrick fitted on fore side of mainmast.



GREAT BRITAIN. Cruiser Minelayer. Adventure. (Stern has been extended.)
 Derricks added abreast masts.



NETHERLANDS. Cruisers. Java, Sumatra.

Fore topmast shortened and foremast made larger.
Mainmast shortened, moved forward and fitted with derrick and searchlights.
Aircraft stowed between funnels and crane fitted.



ITALY. Cruisers. ("Tronto" class.) Trento, Trieste.

Fore topmast removed.



SPAIN. Cruisers. Libertad, Almirante Cervera, Miguel de Cervantes.

The mainmasts are tripods.
Main topgallant mast fitted. Fore topmast and topgallant mast removed.



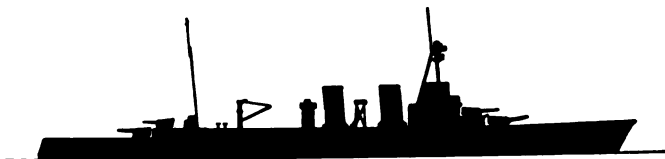
GERMANY. Light Cruiser. Emden.

Pole mast fitted on aft side of after funnel.
Superstructure added before mainmast. Fore topmast shortened.

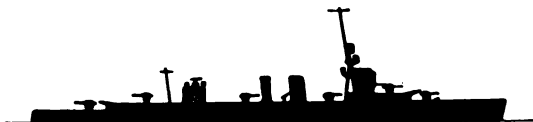


FRANCE. Cruiser Minelayer. Pluton.

Fore topmast shortened.
Derrick fitted on fore side of mainmast.
Guns removed from stern. Guns added before X turret.



FRANCE. Cruisers. ("Duguay-Trouin" class.) La Motte Picquet, Duguay-Trouin, Primauguet.
Catapult fitted on quarter deck.
Fore topmast removed and mast head modified.



GREAT BRITAIN. Cruisers. ("D" class.) Danae, Dauntless, Dragon.
Main topmast added.



GREAT BRITAIN. Cruisers. ("D" class: repeat vessels.) Delhi, Dunedin, Diomedæ, Despatch, Durban.
Foremost gun in Diomedæ is housed in a gunhouse.



GREAT BRITAIN. Cruisers. ("Ceres" class.) Cardiff, Ceres, Curacao.
For Coventry and Curlew, see below.



GREAT BRITAIN. Anti-Aircraft Cruisers. ("Ceres" class.) Coventry and Curlew
(as rearmed 1935).



GREAT BRITAIN. Cruisers. ("Carlsisle" class.) Cairo, Calcutta, Capetown, Carlsisle, Colombo.



GREAT BRITAIN. Cruisers. ("Caledon" class.) Caledon, Calypso, Caradoc.



SOVIET UNION. Cruiser. Krasni Kavkaz.
Catapult fitted between mainmast and funnel.



GREECE. Cruiser. Hella.



SWEDEN. Coast Defence Ships. Gustav V.
Fore topmast added. Bridge work enlarged.
Mainmast and derrick removed.



SWEDEN. Coast Defence Ship. Sverige.



SWEDEN. Coast Defence Ship. Drottning Victoria.



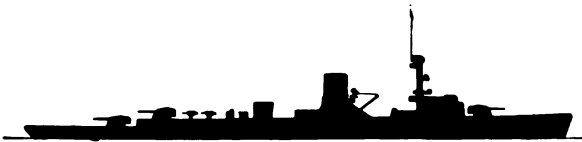
JAPAN. Cruisers. Mikuma, Mogami, Suzuya, Kumano, Tone, Tikuma.



SPAIN. Cruiser. Canarias.
Fore topmast and topgallant mast removed.



FRANCE. Cruiser. Algérie.
Superstructure amidships added.
Crane replaced by two others.



GERMANY. Light Cruiser. Leipzig.
Polemast fitted on aft side of funnel. Catapult fitted between funnel and foremast.
Crane fitted on fore side of funnel.



GERMANY. Light Cruiser. Nürnberg.



GREAT BRITAIN. Cruisers. ("Leander" class.) Leander, Achilles, Neptune, Orion, Ajax.



NETHERLANDS. Cruiser. De Ruyter.



ARGENTINE. Cruisers. Almirante Brown, Vintcento de Maio.
Fore topmast shortened, main topmast lengthened.
Derrick fitted on fore side of mainmast.



JAPAN. Light Cruiser. Yubari.
Masts and funnel raked aft.



GERMANY. Gunnery Training Ship. Bremse.



FINLAND. Armoured Gunboats. Vainämöinen, Ilmarinen.



NORWAY. Minelaying and Training Ship. Olav Trygvason.
Both cranes are fitted abreast mainmast.

FLOTILLA LEADERS AND DESTROYERS

(See pp. 279-305.)



FRANCE. Flotilla Leaders. Cassard, Vauquelin, Kersaint, Tartu, Maille Brézé, Le Chevalier Paul, Algie, Albatros, Espervier, Milan, Gerfaut, Vautour.



ITALY. Destroyers. Gen. A. Cantore, Gen. A. Chinotto, Gen. A. Papa, Gen. A. Cascino, Gen. M. Prestinari, Gen. C. Montanari, A. Bassini, E. Cosenz, F. Stecco, G. Carini, G. Medici, G. Acerbi, G. la Farina, G. la Masa, G. Sirtoti, N. Fabrizi, V. Orsini. Bridgework extended.



FRANCE. Flotilla Leaders. Bion, Guépard, Lion, Vauban, Valmy, Verdun.



GERMANY. Destroyers. "Masse" Class.



UNITED STATES. Destroyers. The "Flush Deck" type; all U.S. destroyers except these with three funnels. Mainmast shortened.



GREAT BRITAIN. Destroyers. "Tribal" Class.



FRANCE. Destroyer. Enseigne Gabele.



YUGO SLAVIA. Flotilla Leader. Dubrovnik.



FRANCE. Flotilla Leaders. Tigre, Chacal, Jaguar, Léopard, Panthère, Lynx. Platform added before after turrets.



JAPAN. 1st Class Destroyers. "Fubuki" class. (24 ships.)



FRANCE. Destroyers. Mistral, Cyclone, Bourrasque, Orage, Ouragon, Simoun, Siroco, Tempête, Tramontane, Typhon, Trombe, Tornado.



FRANCE. Flotilla Leader. Amiral Sérés.

POLAND. Destroyers. Burza, Wicher, are similar. Mainmast shortened.



ITALY. Flotilla Leaders (Scouts). "Navigatori" class. A. da Mosto, etc. (12 ships.)



FRANCE. Flotilla Leaders. "Le Fantasque" class (6 ships). L'Audacieux, Le Malin, Le Terrible, Le Triumphant, L'Indomitable. Control platform added abaft after funnel.



GREAT BRITAIN. Flotilla Leaders. Hardy, Inglefield.



GREAT BRITAIN. Flotilla Leader. *Grenville*.



ITALY. Flotilla Leaders (Scouts). *Leone*, *Pantorn*, *Tigra*.



JAPAN. 1st Class Destroyers. "*Mutsuki*" class (12 ships), and "*Kamikaze*" class (9 ships).



JAPAN. 1st class Destroyers. "*Minekaze*" class (15 ships).



GERMANY. Destroyers. *Ilia*, *Wolf*, *Tiger*, *Luchs*, *Jaguar*, *Leopard*, *Scandier*, *Graif*, *Albatros*, *Kender*, *Falka*, *Möwe*.



GREAT BRITAIN. Flotilla Leader. *Codrington*.



GREAT BRITAIN. Destroyers. "*Acasta*," "*Beagle*," "*Crusader*" and "*Defender*" classes.

"*Acasta*" and "*Crusader*" classes have davits at stern.

Flotilla Leaders. *Kelth*, *Duncan* and *Kempnfelt*.



GREAT BRITAIN. Destroyers. "*Greyhound*," "*Hero*" and "*Intrepid*" Classes.

"*Greyhound*" has davit fitted at stern.



PORTUGAL. Destroyers. *Vouga*, *Lima*, *Dao*, *Tejo*, *Douro*.

COLOMBIA. Destroyers. *Antioquia*, *Caldas*.



ARGENTINE. Flotilla Leaders. *Mendoza*, *La Rioja*, *Tucuman*.



ITALY. Flotilla Leaders (Scouts). *Carlo Mirabella*, *Augusto Riboty*.



GREAT BRITAIN. Flotilla Leaders. *Broke*, *Keppel*, *Wallace*, *Bruce*, *Douglas*, *Campbell*, *Mackay*, *Malcolm*, *Montrose*.

ROYAL AUSTRALIAN NAVY. Flotilla Leader. *Stuart*.

SPAIN. Flotilla Leaders. *Almirante Valdes*, etc., generally similar.



HOLLAND. Destroyers. *Van Ghent*, *Evertsen*, *Piet Hein*, *Kortenaar*, *Banckert*, *Van Nes*, *Van Galen*, *Witte de With*.



GREAT BRITAIN. Destroyers. *Vanessa*, *Vanity*, *Vanoc*, *Vanquisher*, *Vega*, *Volex*, *Vendetta*, *Venetia*, *Verdun*, *Versatile*, *Vesper*, *Vidette*, *Vimiera*, *Violent*, *Vivacious*, *Vivien*, *Vimy* (late *Vancouver*), *Vortigern*, *Valentina*, *Valorous*, *Vampire*, *Viceroy*, *Viscount*, *Voyager*, *Wakeful*, *Walker*, *Walpole*, *Walrus*, *Warwick*, *Watchman*, *Waterhen*, *Wessex*, *Westcott*, *Westminster*, *Whirlwind*, *Whitley*, *Winchelsea*, *Winchester*, *Wolfhound*, *Wolsey*, *Woolston*, *Wrestler*, *Wryneck*, *Vansittart*, *Venomous*, *Verity*, *Volunteer*, *Wanderer*, *Wren*, *Windsor*, *Veteran*.



GREAT BRITAIN. Destroyers. *Whitehall*, *Whitshed*, *Wildswan*, *Witherington*, *Wivern*, *Wolverine*, *Worcester*, *Wishart*, *Witch*.



GREAT BRITAIN. Destroyers. *Ambuscade*, *Amazon*.



CHILE. Destroyers. Serrano, Orella, Riquelme, Hyatt, Vidella, Aldoa.



SWEDEN. Destroyers. Klas Horn, Klas Uggle, Ehrensköld, Nordenskjöld. Davit fitted at stern.



JAPAN. 2nd class Destroyers. "Wakatake" class (7 ships), and "Kaya" class (19 ships).



FRANCE. Destroyers. Aventurier, Intrépide.



ITALY. Destroyers. O. Sella, B. Ricca, F. Crispi, G. Nicotera. Bridgework extended. Platform fitted round mainmast.



ITALY. Destroyers. Alessandro Poerio and Guglielmo Pepe. Searchlight platform added before mainmast.



JAPAN. Destroyers. "Hibiki" class.



JAPAN. Destroyers. "Ariake" class (17 ships).



GREAT BRITAIN. Flotilla Leaders. Exmouth, Faulknor. Destroyers. "Eclipse" and "Fearless" classes similar but gun between funnels omitted.



GREAT BRITAIN. Destroyers. Admiralty "g" class.



ITALY. Destroyers. Palestro, San Saverio, Martino, Confienza. Bridge and foremost funnel heightened.



ITALY. Destroyers. Turbine. Nembo, Euro, Borea, Espero, Ostro, Zeffiro, Aquilone, N. Sauro, F. Nullo, D. Manin, C. Battisti. Bridge and foremost funnel heightened.



DENMARK. Torpedo Boats (1st Class). Glentia, Hogen, Ornen, Laxen, Dragen, Hvalen.



UNITED STATES. Destroyers. "Farragut" class.



POLAND. Destroyers. Grom, Blyskawica.



UNITED STATES. Destroyers. "Maury" Class.



ITALY. Destroyers. Dardo, Freccia, Strale, Saetta, Folgore, Lampo, Baleno, Fulmine. Bridgework extended. Control platform fitted between torpedo tubes.



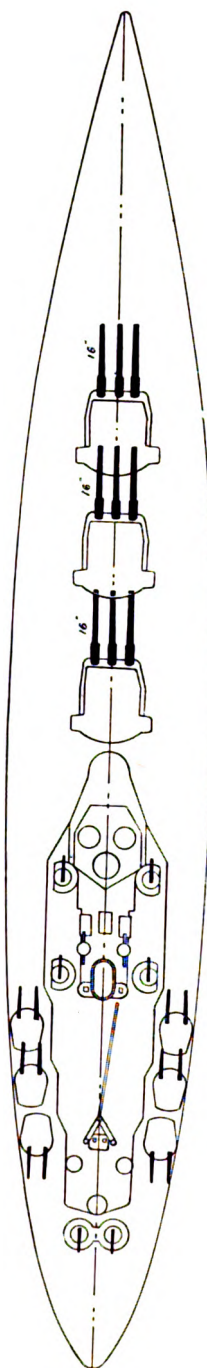
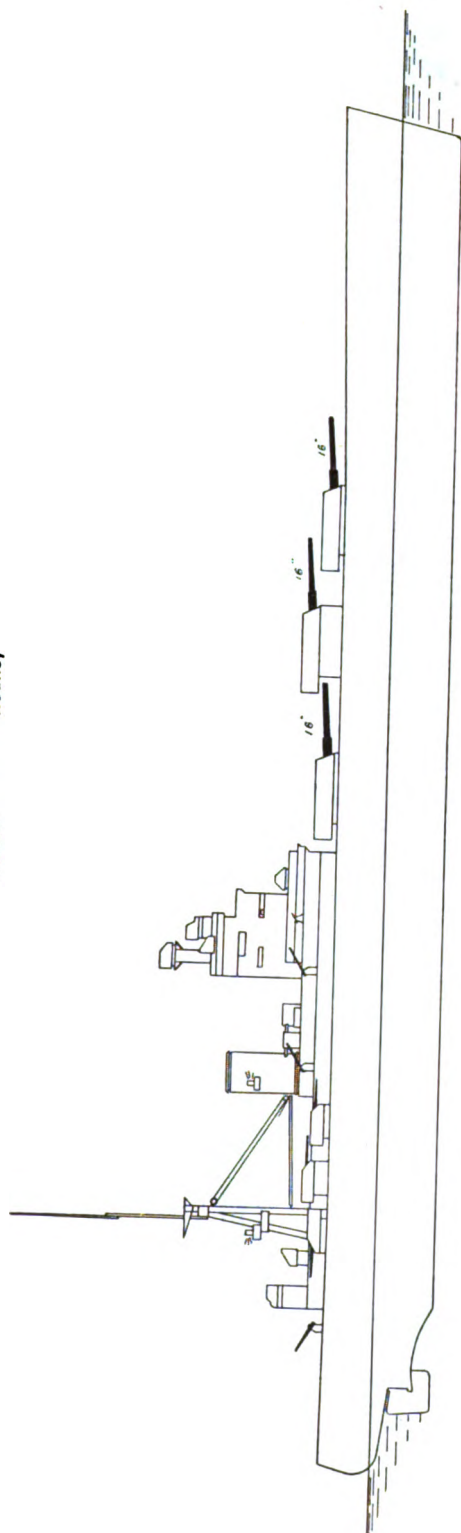
GREECE. Destroyers. Hydra, Spetzai, Psara and Countouriotis.

**PLANS OF
BRITISH AND FOREIGN WARSHIPS**

GREAT BRITAIN.

BATTLESHIPS.

Nelson. Rodney

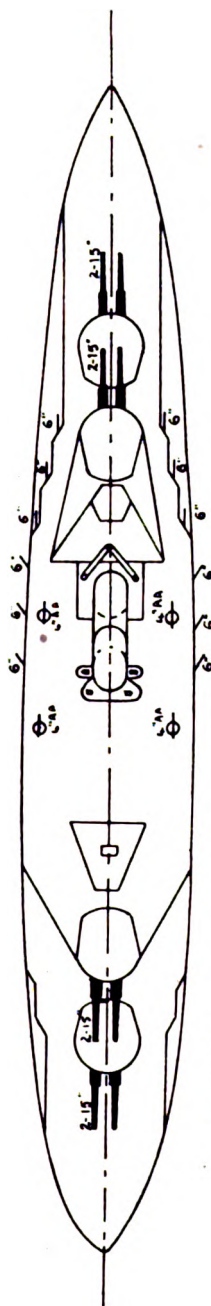
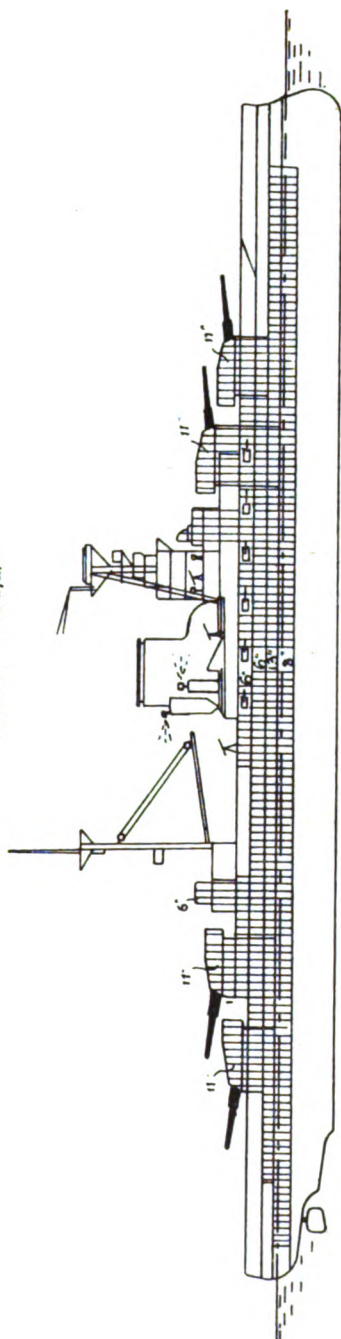


Length (extreme), 710 ft.; Rodney, 33,900 tons; Nelson, 33,500 tons; Speed, 23 knots; Completed, 1927.
 Armament, 9—16-in. ; 12—6-in. ; 6—4.7-in. A.A. ; 4—3-pr. 2—2-pr. Pom Poms (3 in Rodney) ; 11 L ; 5 M ; 2—24-in. submerged torpedo tubes.
 NOTE.—A 14-in. waterline armour belt extends from approximately the foremost 16-in. turret to approximately the aftermost 6-in. turret. The turret armour varies from 16-in. to 9-in.
 Correction to plan.—Mast structure increased. Nelson has a crane amidships. Rodney has a catapult on "C" turret.

GREAT BRITAIN

BATTLESHIPS.

Barham. Malaya.



Length B.P., 600 ft.; (extreme 6392-6444 ft.); 31,100 tons; Speed, 25 knots (without bulges); Completed, 1915-1916.
Armament, 8-15-in.; 12-6-in. A.A.; 8-4-in. A.A.; 4-3-pr.; 5 M.; 10 L.

NOTES.—Barham has tripod mainmast, main topgallant mast, cataput on "X" turret and a crane abreast mainmast. Malaya has main topgallant mast, cataput before mainmast, a hangar and crane each side abreast funnel. Mainmast, 8-10-in.; 12-6-in. A.A.; 4-3-pr.; 5 M.; 10 L.

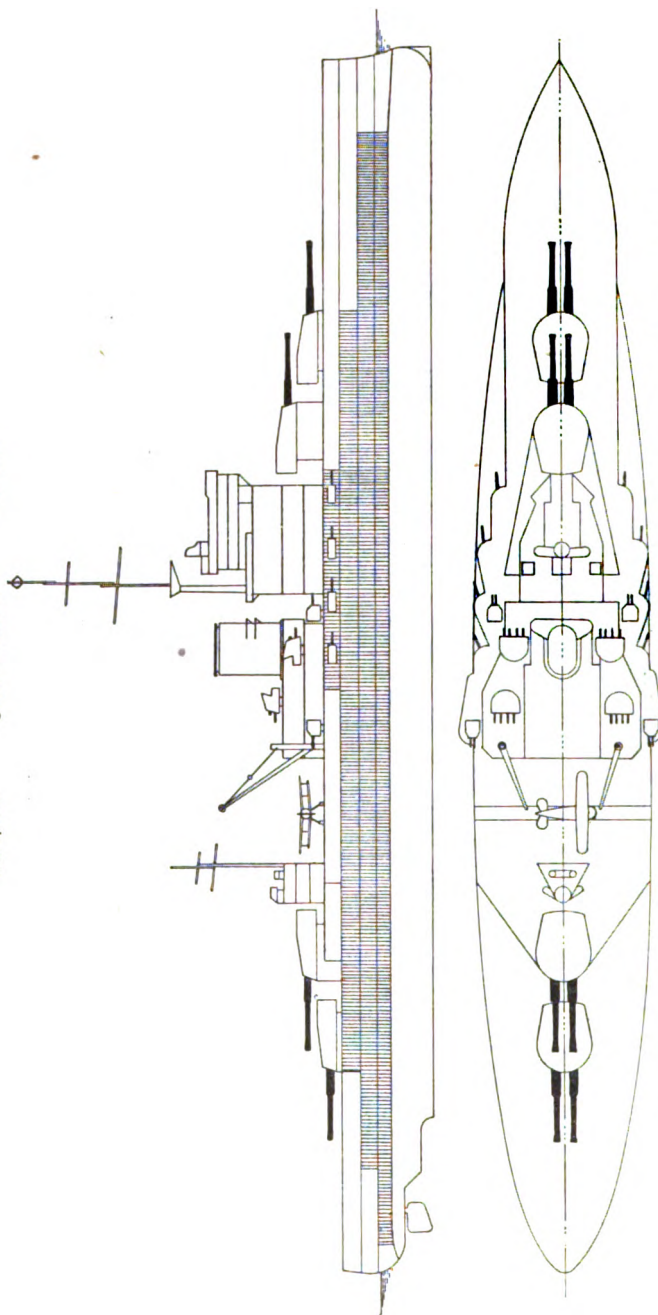
GREAT-BRITAIN.

BATTLESHIPS.

Warspite.

Queen Elizabeth.

Valiant.



Length B.P., 600 ft.; (extreme 639 ft. 8 ins.—646 ft.); 31,100 tons; Speed, 25 knots; Completed, 1915-1916.
 Armament, 8—15-in.; 12—6-in.; 8—4-in. A.A.; 4—3-pdr. Pom Poms; 1 catapult; 1 aircraft. Valiant has 4—4-in. A.A.

NOTES.—Queen Elizabeth and Valiant have tripod foremasts and are under reconstruction.

BATTLE-CRUISER.

Hood.



Length (extreme), 860 ft. 10 ins.; Length B.P., 810 ft.; 42,100 tons; Speed, 31¹/₂ knots; Completed, 1920.
Armament, 8-15-in.; 10-6.5-in.; 8-4-in. A.A.; 4-3-pdr.; 5 m.; 10 L.; 2-2-pdr. Pom Poms; 4 A.W. and 2 sub. 21-in. torpedo tubes.
Trials at 44,600 tons, 31-80 knots with 151,000 tons of fuel.

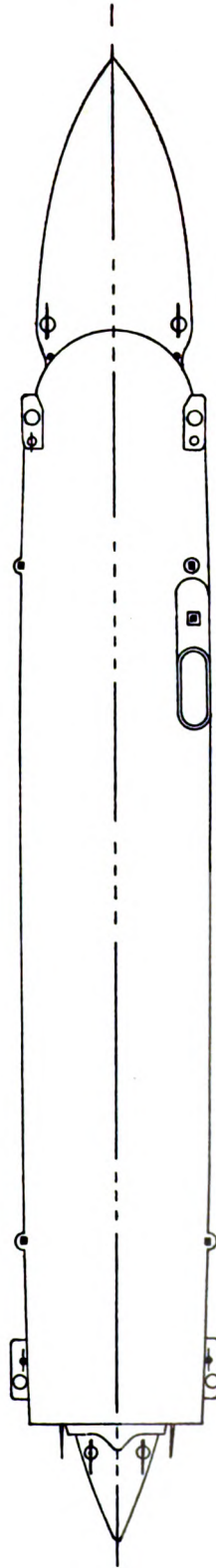
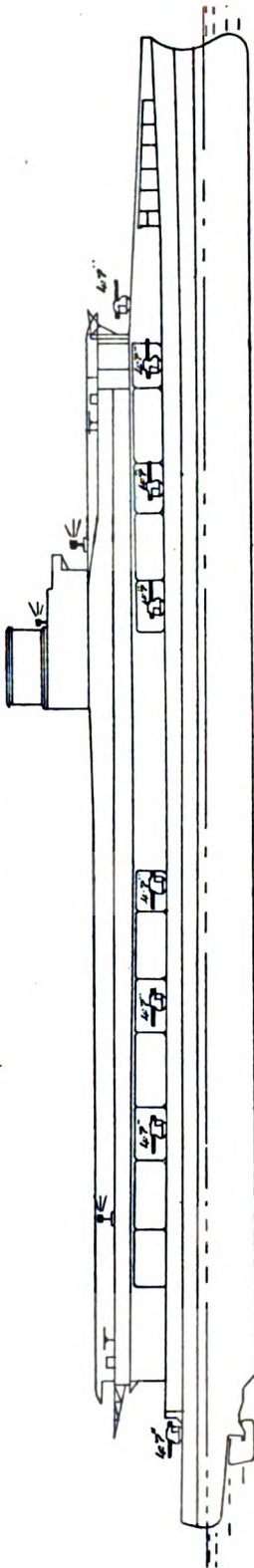
Correction to plan.—Fore topgallant mast added and bridgework modified.

GREAT BRITAIN.

AIRCRAFT CARRIERS.

Courageous.

Glorious.

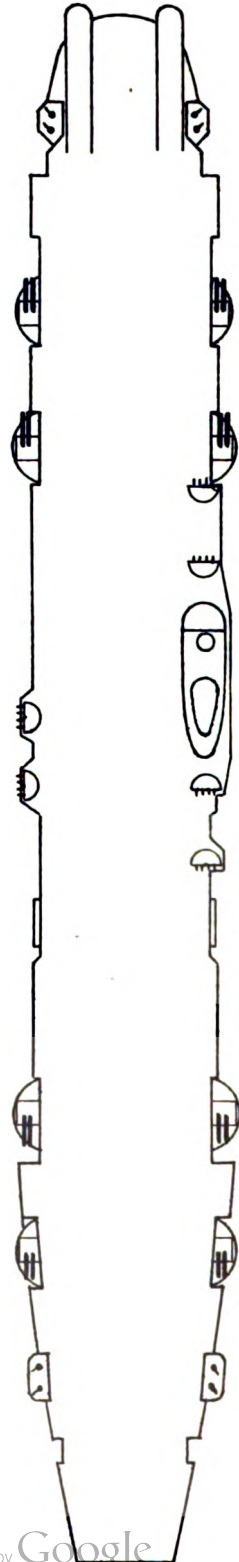
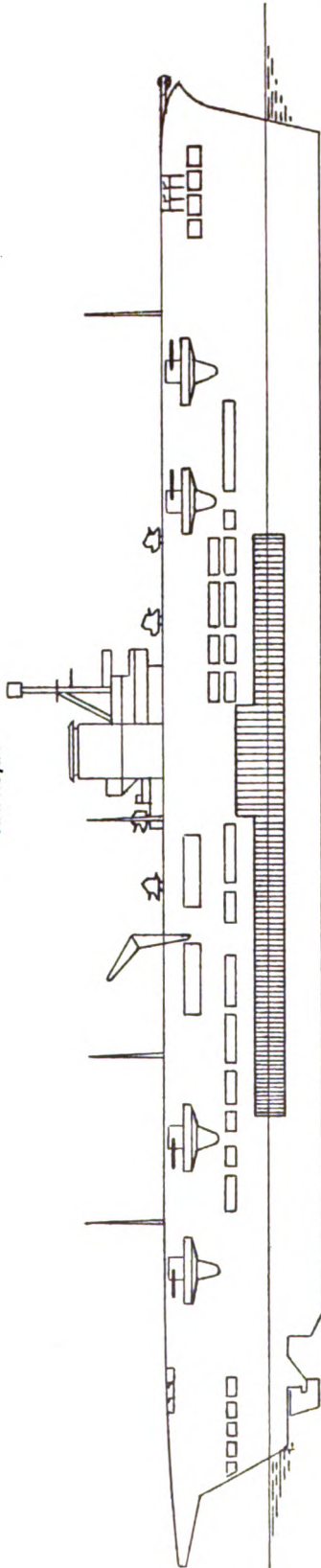


Length (extreme), 786 ft. 3 ins. ; 22,500 tons ; Speed, 30½ knots ; Launched as cruisers (1916) ; converted to aircraft carriers (completed, 1923 and 1930 respectively).
Armament, 18—4·7-in. ; 4—3-pr. ; 3—2-pr. Pom Poms ; 4 M. ; 10 L. ; 48 aircraft.

Corrections to plan.—In Glorious the flight deck extends to stern, quarter mast added before funnel, and three wireless masts added each side of flight deck.

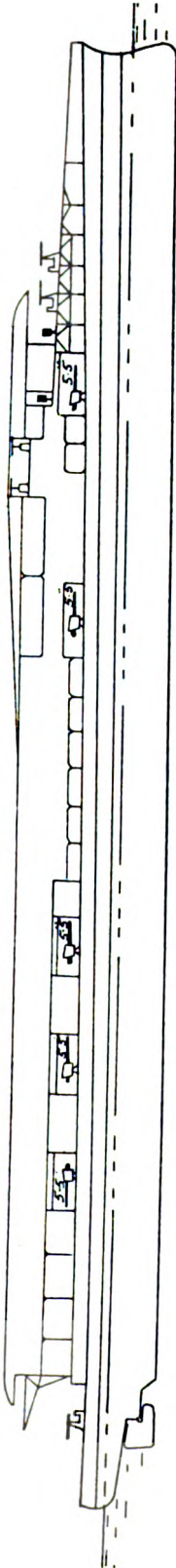
In Courageous the flight deck extends almost to the stern ; a tripod mast added before funnel, and three wireless masts added each side of flight deck.

GREAT BRITAIN.
AIRCRAFT CARRIER.
Ark Royal.



Length (extreme) 800 ft. ; 22,000 tons ; 30½ knots ; Completed, 1938.
Armament, 16—4.5-in. guns, 4—8 pr. ; 70 aircraft.

GREAT BRITAIN.
AIRCRAFT CARRIER.
Furious.

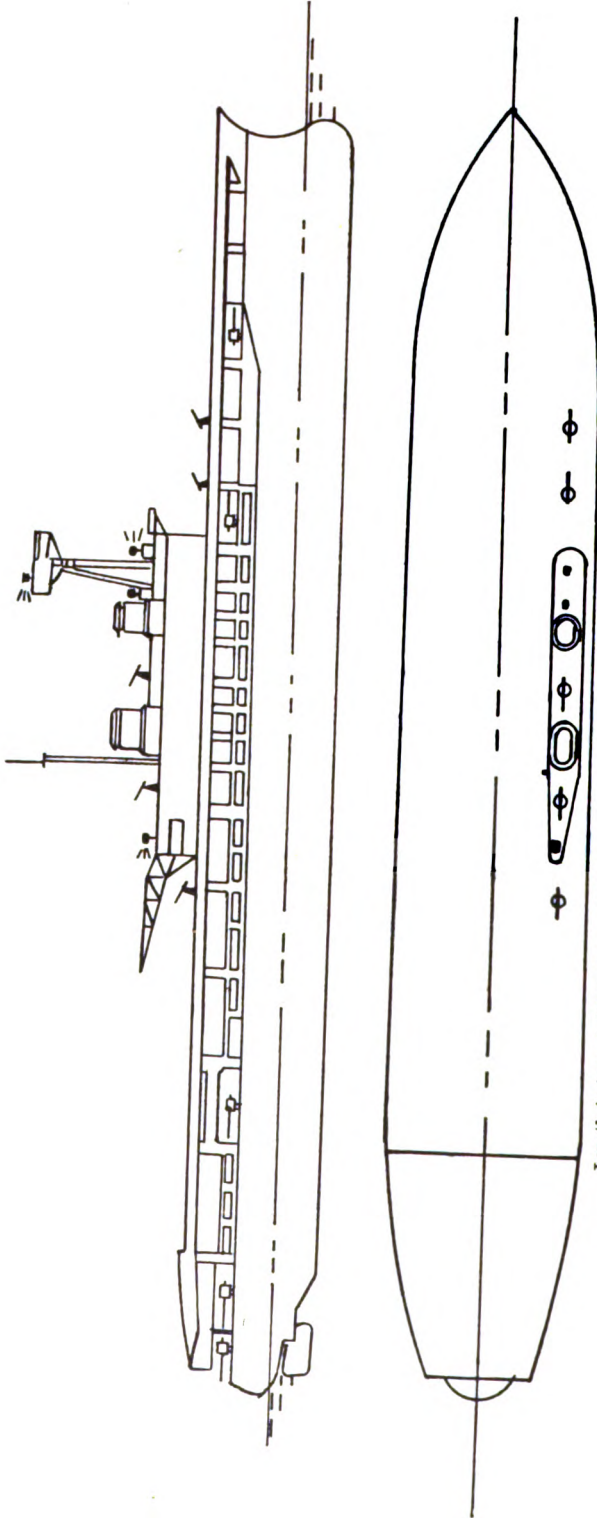


Length (extreme), 786 ft. 6 ins. ; 22,450 tons; Speed, 31 knots; Completed as a cruiser, 1917; Conversion to aircraft carrier completed, 1925.

Armament, 10—6.5-in. ; 3—4-in. A.A. ; 4—3-pr. ; 4—2-pr. ; 46 smaller ; 33 aircraft.

Three wireless masts added each side of flight deck. Quarter deck has been raised one deck.
Platform built on flight deck forward.

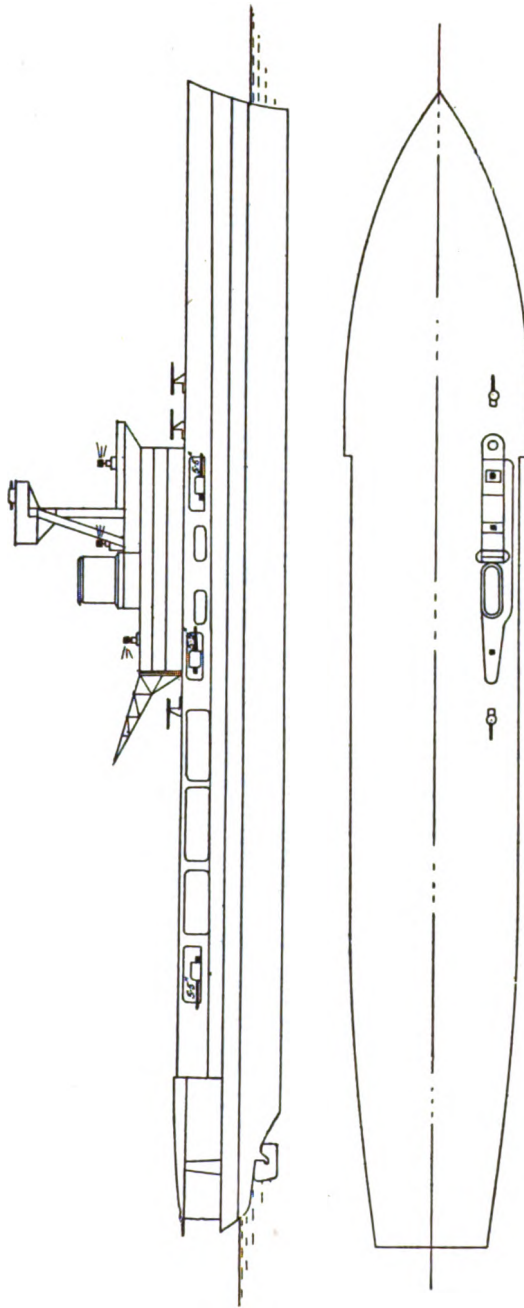
GREAT BRITAIN.
AIRCRAFT CARRIER.
Eagle.



Length (extreme), 667 ft. 6 ins. ; 22,600 tons ; Speed, 24 knots ; Completed as an aircraft carrier, 1924.
Armament, 9-6-in. A.A. ; 4-3-pr. ; 32 smaller ; 20 aircraft.
Fore topmast added and mast structure modified.
Signal mast added forward.

GREAT BRITAIN.
AIRCRAFT CARRIER.

Hermes.

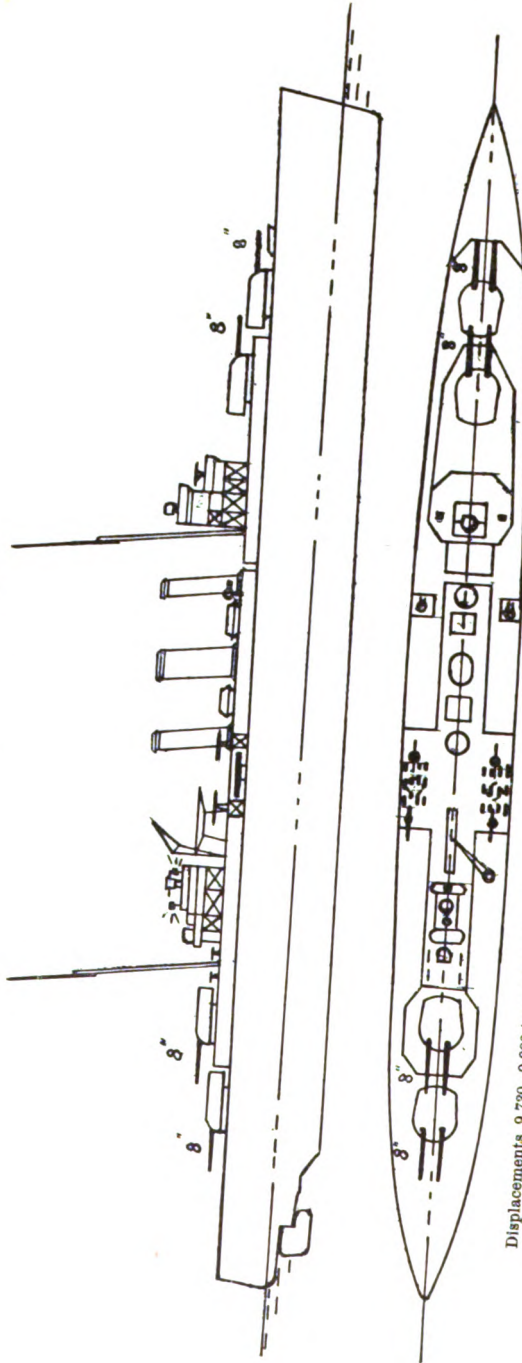


Length (extreme), 590 ft. 6 ins. ; 10,850 tons ; Speed, 25 knots ; Completed, 1924.
Armament, 6—6-in. ; 3—4-in. A.A. ; 4—3-pr. ; 2—2-pr. Pom Poms ; 4 m. ; 16 L. ; 15 aircraft.
Flight deck extended aft. Fore topmast and signal mast forward added.

GREAT BRITAIN.

CRUISERS.

London.	"London" Class.	
Sussex.	Shropshire.	Devonshire.
	"Norfolk" Class.	
Dorsetshire.*	Norfolk.*	



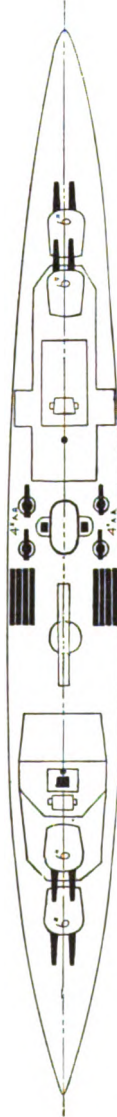
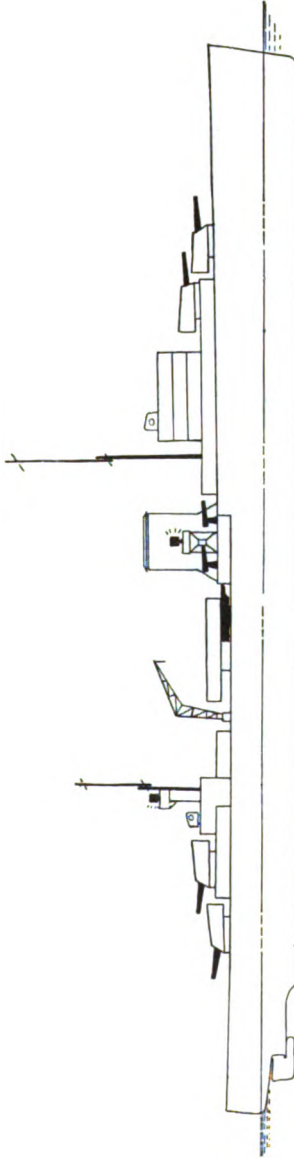
Displacements, 9,730—9,900 tons : Length (extreme), 630 ft. ; Norfolk and Dorsetshire, 633 ft. Armament, 8-8-in. ; 8-4-in. A.A. ; 4-3-pr. ; 4-2-pr. Pom Poms ; 4 M. ; 8 L. ; 8-21-in. torpedo tubes ; 1 aircraft ; 1 catapult.
 * In Dorsetshire and Norfolk the seaplane crane and the 4-4-in. guns are slightly forward of the positions shown.
 Fore topgallant mast added.

GREAT BRITAIN.

CRUISERS.

"Leander" Class.

Leander. Achilles. Neptune. Orion. Ajax.



Displacement, 6,985-7,270 tons ; Length (extreme), 554 ft. 6 ins. ; Speed, 32½ knots. Armament, 8—6-in., 4—4-in. A.A., 4—3-pr., 8 torpedo tubes, 1 catapult ; 2 aircraft. Ajax has 8—4-in. A.A.

Leander and Achilles are attached to New Zealand division and have 1 aircraft.

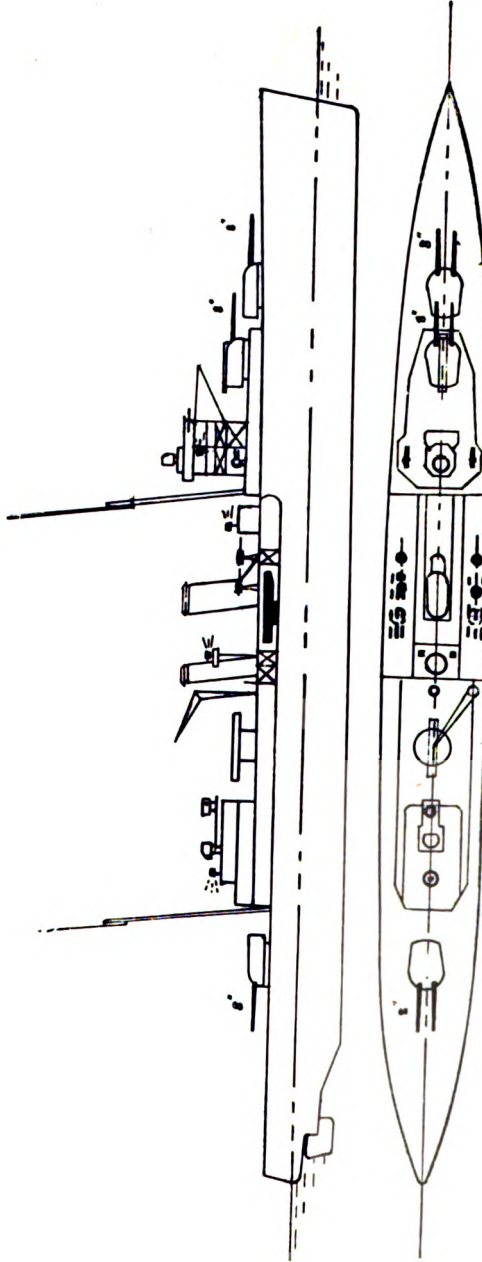
GREAT BRITAIN.

CRUISERS.

"York" Class.

York,

Exeter.*



Displacement: York, 8,250 tons; Exeter, 8,300 tons; Length (extreme), 575 ft.; Speed: York, 32½ knots; Exeter, 32 knots. Armament, 6—8-in.; 4—4-in. A.A.; 4—3-pr.; 2—2-pr.; 4 M.; 3 L.; 6—21-in. torpedo tubes; 2 catapults and 2 aircraft in Exeter; 1 catapult and 1 aircraft in York.

* In Exeter funnels and masts are vertical, and the mainmast is taken up through the superstructure.

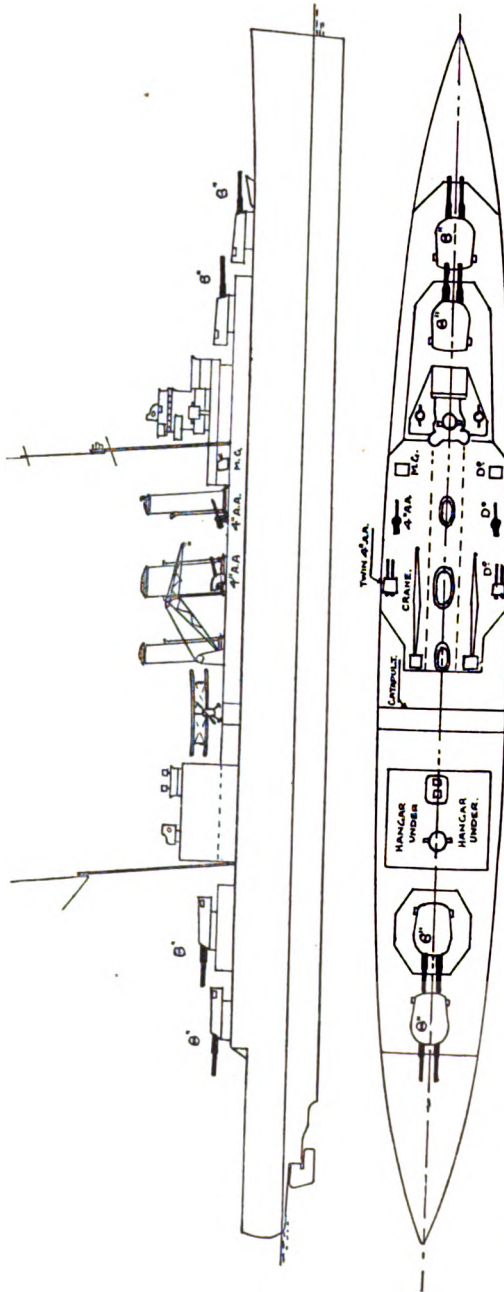
GREAT BRITAIN.

CRUISERS.

"Kent" Class.

Berwick.	Kent.	Cumberland.	Suffolk.	Cornwall	Australia.*	Canberra.*
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(As reconstructed 1930-1938.)



Length (extreme), 630 ft. ; Speed 31½ knots ; Completed 1928. Armament, 8—8-in. ; 8—4-in. A.A. ; 2 multi-machine guns ; 1 catapult ; 3 aircraft
 Kent, Australia and Canberra have 1 aircraft ; Cumberland and Suffolk have 6—4-in. A.A. ; Australia and Canberra have 4—4-in. A.A.

NOTES.—Berwick, Kent, Cornwall, Australia, and Canberra are flush-decked.

* Royal Australian Navy. Australia and Canberra are not provided with hangars.

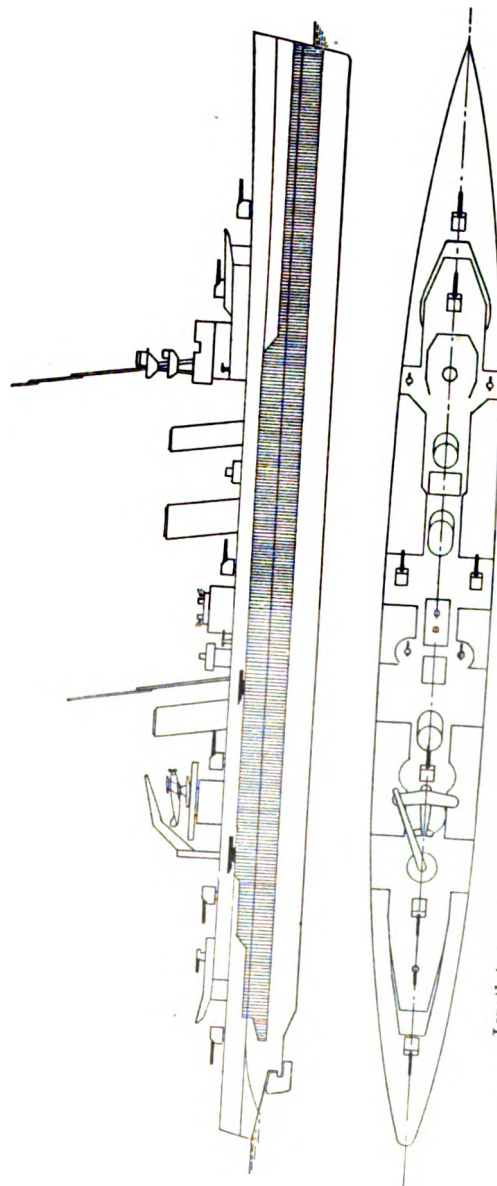
GREAT BRITAIN.

CRUISERS.

"E" Class.

Emerald.

Enterprise.*



Length (extreme), 570 ft. ; Length B.P., 535 ft. ; Emerald, 7,550 tons ; Enterprise, 7,580 tons ; Speed, 33 knots.
Armament, 7-6-in. ; 3-4-in. A.A. ; 4-3-pr. ; 2-2-pr. Pom Poms ; 2 M. ; 8 L. ; 16-21-in. torpedo tubes ; 1 catapult ; 1 aircraft.
* In Enterprise the two forward 6-in. guns are mounted in a twin mounting on forecastle deck.

GREAT BRITAIN.

CRUISERS.

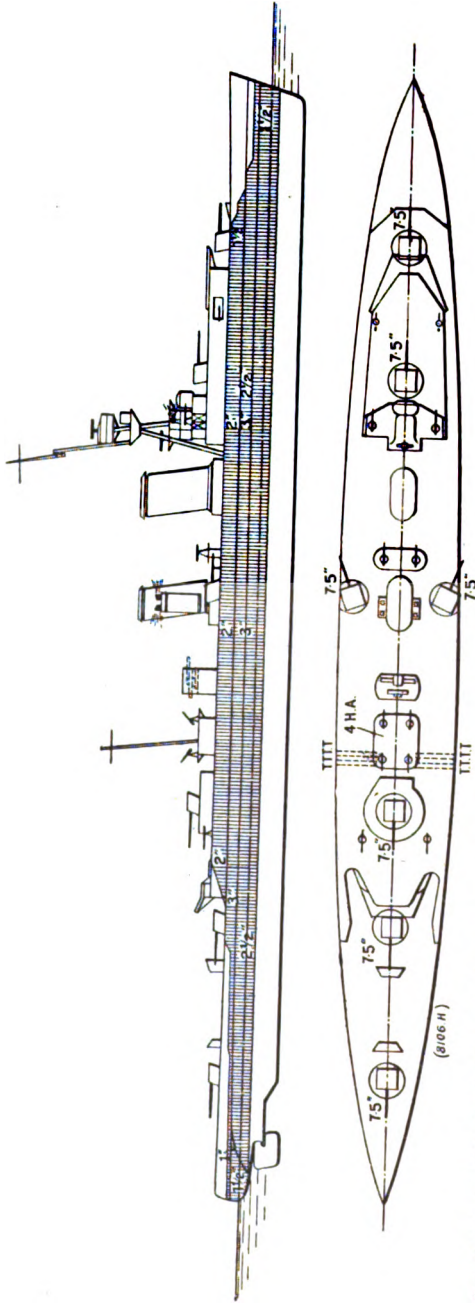
Improved "Birmingham" Class.

Effingham.

Hawkins.

Frobisher.

Vindictive.*



Length (extreme), 605 ft. ; Length B.P., 565 ft. ; 9,550—9,800 tons ; Speed: Effingham 29½ knots ; Frobisher 30½ knots ; Vindictive 30 knots ; Hawkins 29½ knots.
 Armament: Effingham: 9—6-in. ; 4—4-in. A.A. ; 4—3-pr. ; 2 M. ; 8 L. ; 2—2-pr. ; 2 M. ; 8 L. ; 4 torpedo tubes. Frobisher: 4—3-pr. ; 2 M. ; 8 L. ; 2 torpedo tubes.
 Hawkins: 4—4-in. A.A. ; 4—3-pr. ; 2 M. ; 8 L. ; 6 torpedo tubes. Vindictive: 2—4.7-in. ; 4—3-pr. ; 1—2-pr. ; 2 M. ; 8 L.

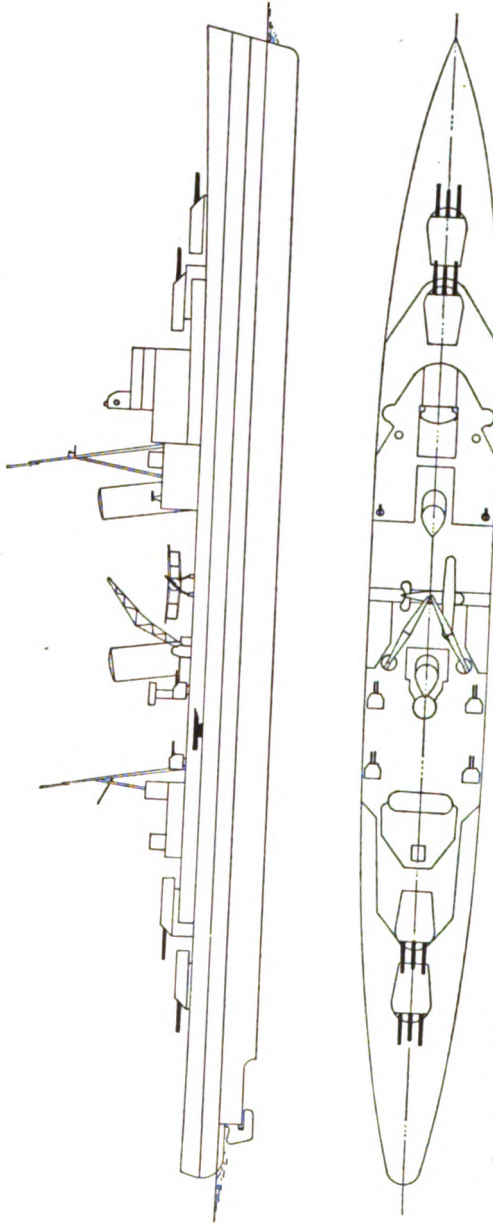
* Vindictive is used as a training ship and has an aircraft hangar mounted forward of the bridge. After funnel removed and seaplane crane fitted aft.
 Correction to plan.—In Effingham, Hawkins and Frobisher the after funnel is removed and a crane fitted in its place.
 In Effingham another gun is added forward and aft. The 7.5-in. guns have been removed.

GREAT BRITAIN.

CRUISERS.

"Southampton" Class.

Southampton, Newcastle, Sheffield, Birmingham, Glasgow, Gloucester, Liverpool, Manchester.



Length (extreme), 591 ft. 6 ins.; 9,100 tons (Liverpool, Manchester and Gloucester 9,400 tons); Speed, 32 knots; Completed, 1937-38.
Armament, 12-6-in.; 8-4-in. A.A.; 2-2-Pdr.; 6-21-in. torpedo tubes; 1 catapult; 3 aircraft.

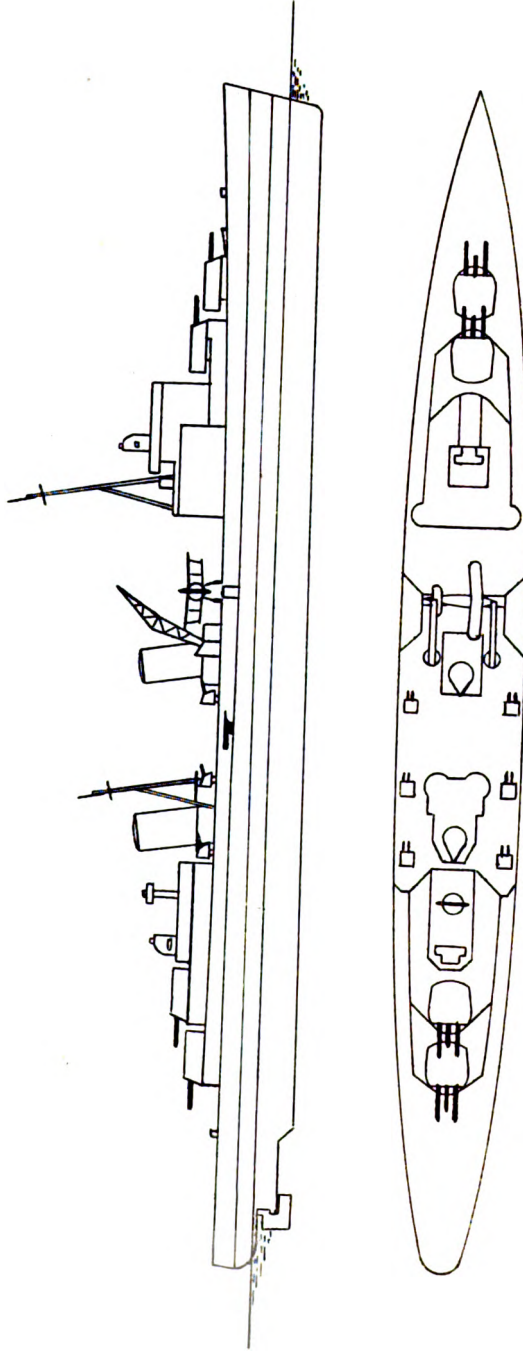
GREAT BRITAIN.

CRUISERS.

Improved "Southampton" Class.

Belfast.

Edinburgh.



Length (extreme) 613 ft. 6 ins. ; 10,000 tons ; speed 32½ knots.
Armament, 12—6-in. ; 12—4-in. A.A. ; 20 smaller guns ; 6 torpedo tubes.

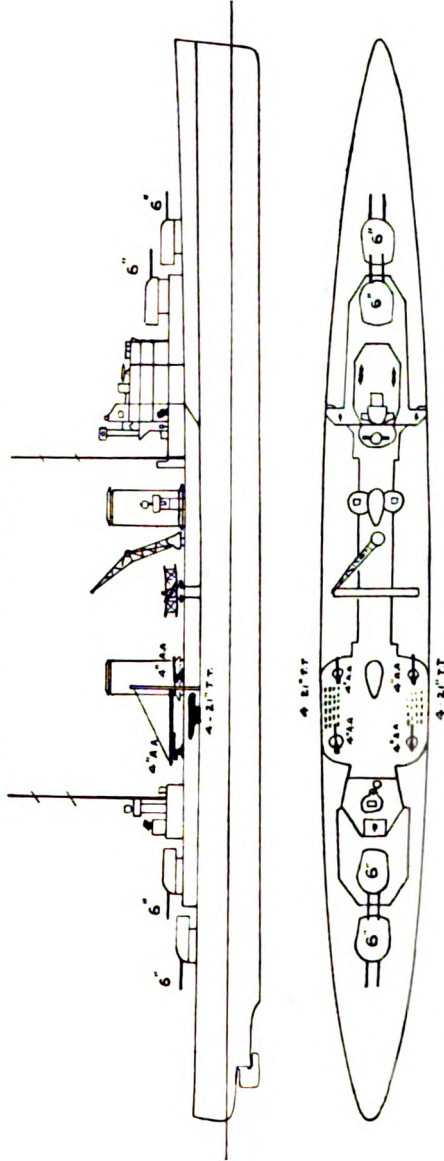
GREAT BRITAIN.
CRUISERS.

"Amphion" Class.

•Hobart (ex Apollo).

•Sydney.

Amphion.



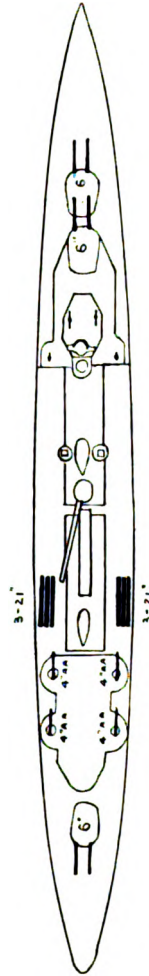
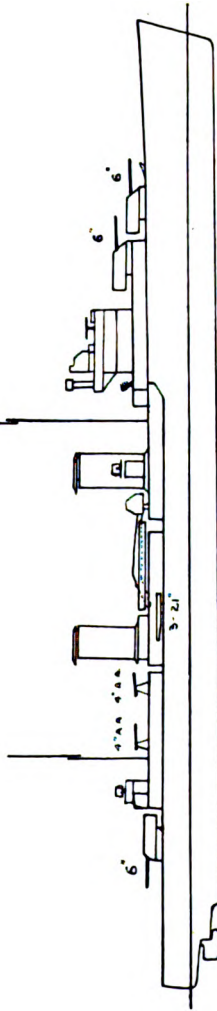
Displacement, 6,830-7,040 tons ; Length (extreme), 560 ft. ; Speed, 82½ knots.
Armament, 8-6-in ; 4-4-in. A.A. ; 21 smaller guns ; 4 quadruple 21-in. torpedo tubes ; 1 catapult ; 2 aircraft.
Amphion and Hobart carry 2 aircraft and Sydney 1 aircraft. Sydney completed, 1935 ; Amphion and Hobart completed in 1936.
• H. M. Australian Navy.

GREAT BRITAIN.

CRUISERS

"Arethusa" Class.

Arethusa. Galatea. Penelope. Aurora.



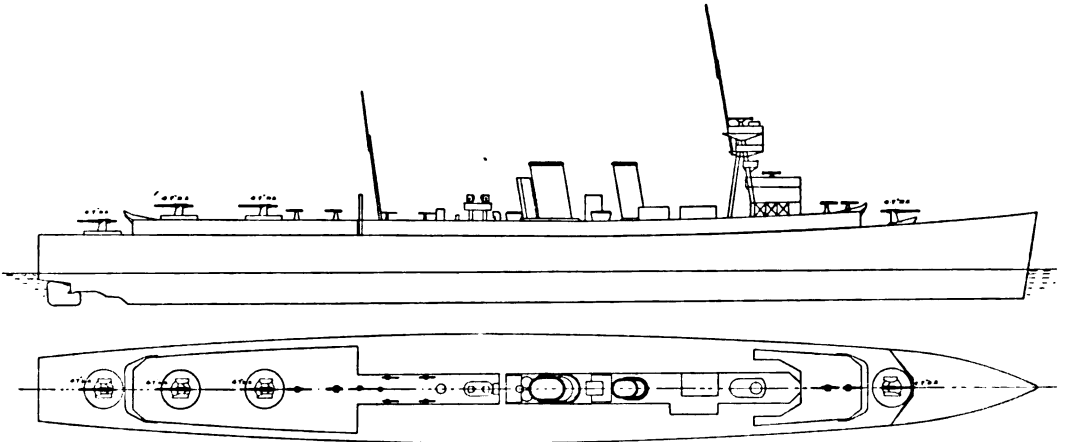
Displacement, 5,220-5270 tons ; Length (extreme), 506 ft. ; Speed, 33½ knots; completed 1935-37.
 Armament, 6-6-in. ; 4-4-in. A.A. ; 2-3-pdr. ; 18 smaller ; 2 triple 21-in. torpedo tubes ; 1 catapult, 1 aircraft.

Aurora and Penelope have 4 twin 4-in. A.A. mountings instead of singles.
 Derrick fitted on aft side of after funnel.

GREAT BRITAIN.

CRUISER MINELAYER.

Adventure.



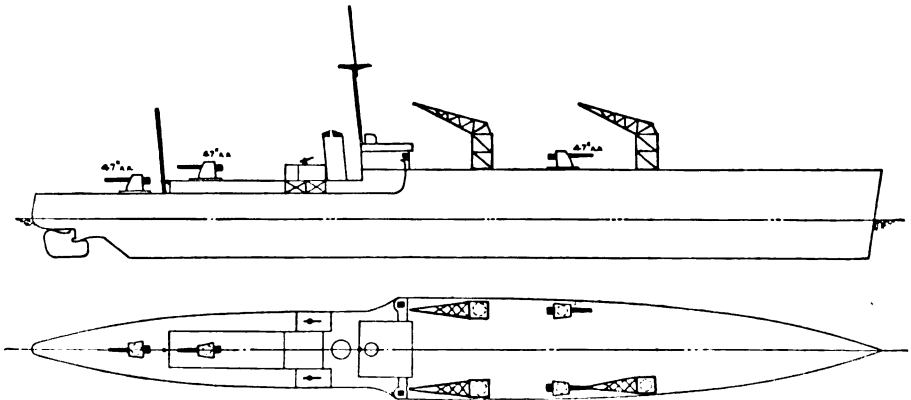
Length (extreme), 639 ft. ; Length B.P., 500 ft. ; 6,740 tons ; Speed, 28 knots.

Armament, 4—4·7-in. A.A. ; 4—3-pr. ; 4—2-pr. ; 2 M. ; 8 L. ; 310 mines.

Stern has been lengthened and rounded in plan. Derricks added abreast masts.

SEAPLANE CARRIER.

Albatross.



Length, 443½ ft. ; 4,800 tons ; Speed, 21 knots ; Completed, 1929.

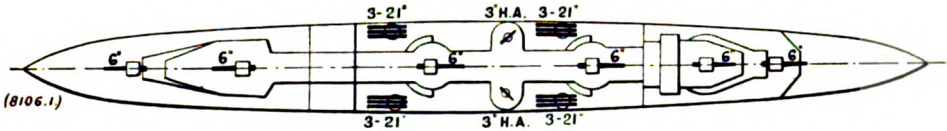
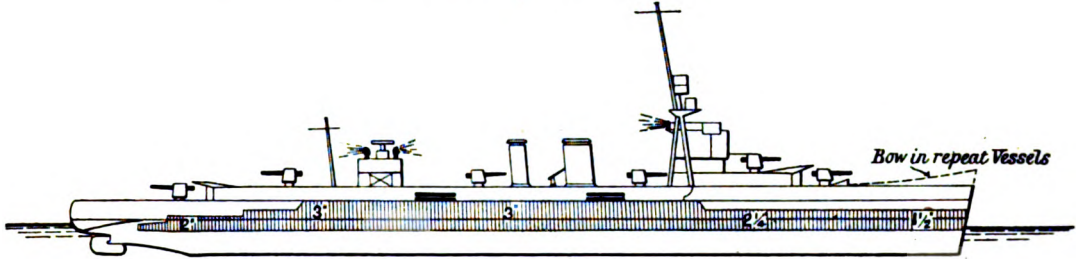
Armament, 4—4·7-in. A.A. ; 4—2-pdr. Pom Poms ; 4—3-pdr. ; 4 M. ; 20 L. ; 9 seaplanes.

GREAT BRITAIN.

CRUISERS.

"D" Class.

*Despatch. *Diomedes. Danae. Dauntless. Dragon. *Delhi.
*Dunedin. *Durban.



Length, 472½ ft. ; 4,850 tons ; Speed, 29 knots ;
Armament, 6—6-in. ; 3—4-in. A.A. ; 4—3-pr., 2—2-pr. ; 2 M ; 8 L ; 12—21-in. torpedo tubes.

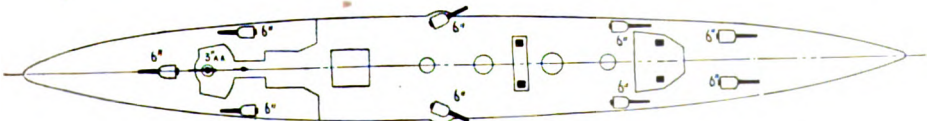
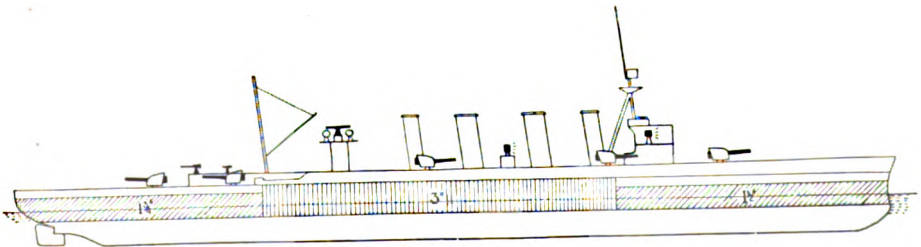
Main topmast fitted. Foremost gun in Diomedes housed in gunhouse.

* Repeat vessels.

ROYAL AUSTRALIAN NAVY.

CRUISER.

Adelaide.



Length, 462½ ft. ; 5,100 tons ; 25½ knots.
Armament, 9—6-in. ; 4—3 pr. ; 1—3-in. A.A. ; 8 L ; 2 submerged 21-in. torpedo tubes.

GREAT BRITAIN.

CRUISERS.

"Ceres" Class.

Ceres.

Curacao.

Cardiff.

"Carlisle" Class.

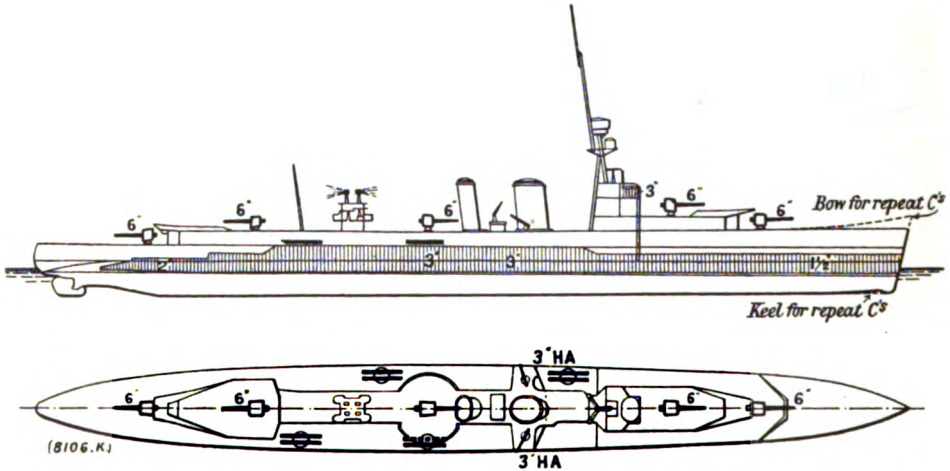
*Cairo.

*Cape Town.

*Carlisle.

*Colombo.

*Calcutta.



Length (extreme), 450 ft. (451 ft. 9 ins. Repeat Vessels); Length B.P., 425 ft.; 4,290 tons; Repeat vessels, 4,200 tons; Speed, 29 knots; Completed, 1917-18 (Repeat Vessels, 1918-22).

Armament, 5—6-in.; 2—3-in. A.A.; 4—3-pr.; 2—2-pr. Pom Poms; 4 above-water 21-in. D.R. torpedo tubes. Cardiff, Curacao, and Ceres have 2—3-pr.

Cairo is rearmed as anti-aircraft cruiser, having 10—4-in. A.A. and 12 smaller guns.

* Repeat vessels.

GREAT BRITAIN.

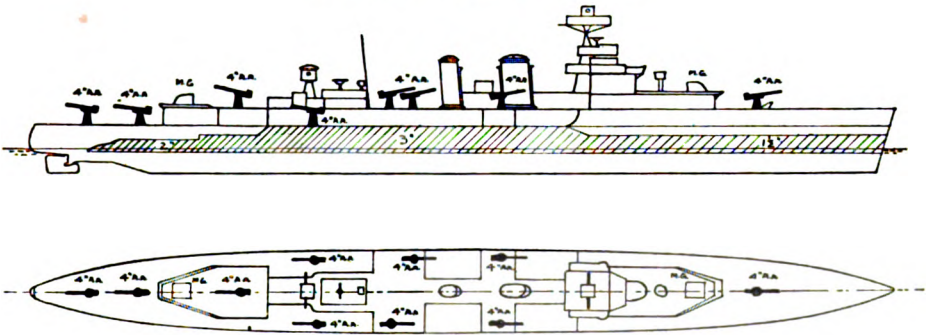
CRUISERS.

"Ceres" Class.

Coventry.

Curlew.

Rearmed as Anti-Aircraft gun ships 1935.



Length (extreme), 450 ft. ; 4,290 tons ; Speed, 29 knots ; Completed, 1917.

Armament, 10—4-in. A.A. ; 2—3-pdr. ; 2 multi machine guns ; 2 M.G. ; 8 L. ; 8—21-in. torpedo tubes.

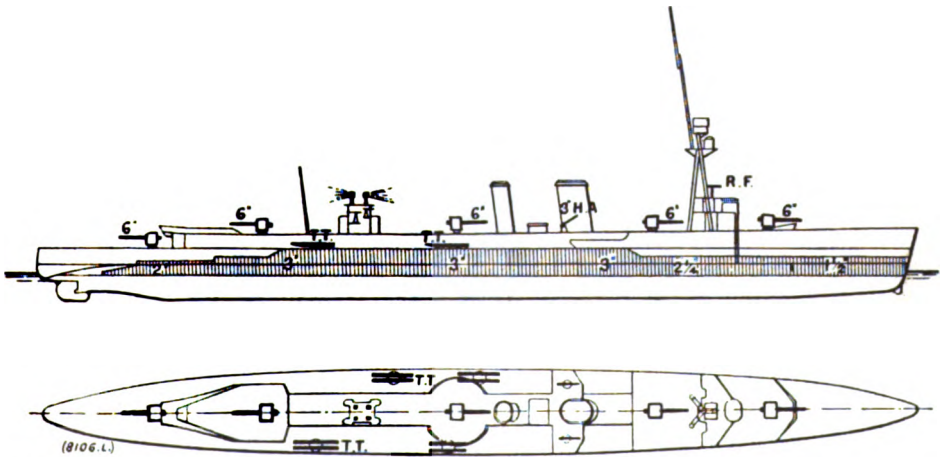
CRUISERS.

"Caledon" Class.

Caledon.

Calypso.

Caradoc.



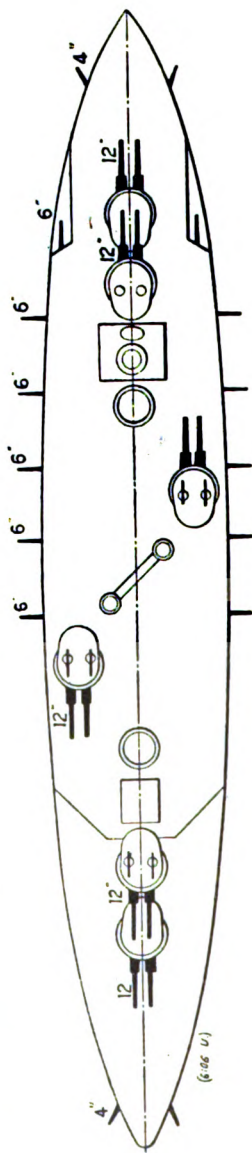
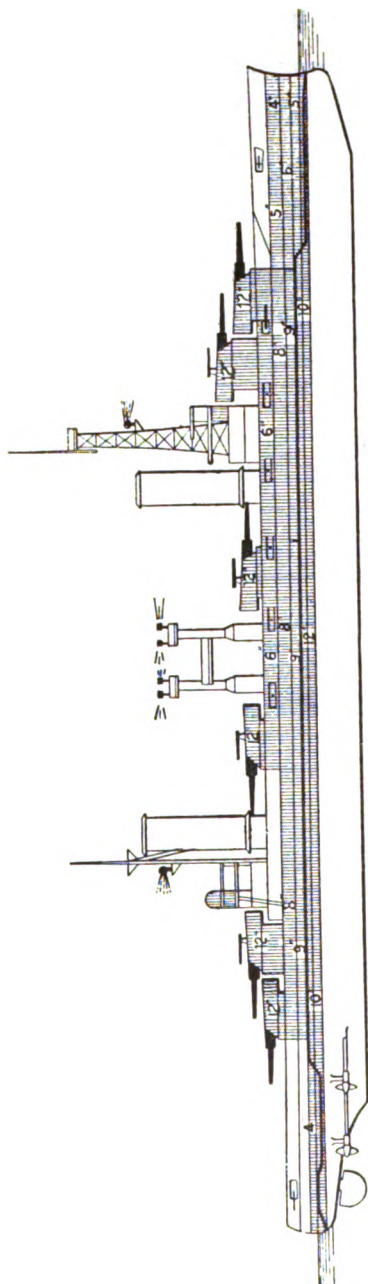
' Caledon } Length (extreme), 450 ft. ; Length B.P., 425 ft. ; 4,180 tons ; Speed, 29 knots ; Completed, 1917.
 Calypso } Armament, 5—6-in. ; 2—3-in. A.A. ; 4—3-pr. ; 2—2-pr. Pom Poms ; 2 M. ; 8 L. ; and 4 above-water 21-in.
 Caradoc } D.R. torpedo tubes.

ARGENTINE.

BATTLESHIPS.

Moreno.

Rivadavia.



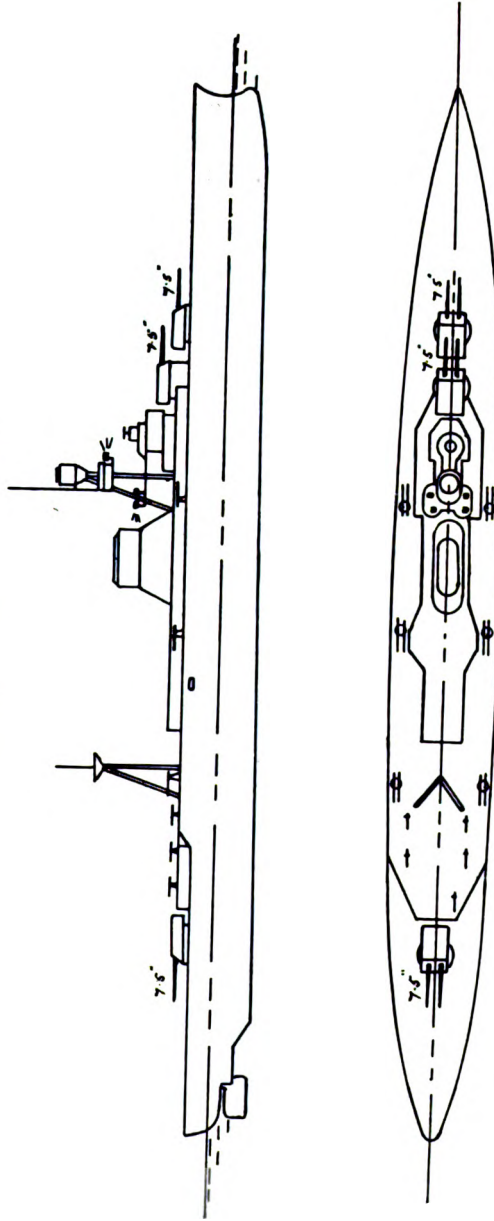
Length (extreme), 585 ft. ; Length on W. L., 575 ft. ; 27,940 tons ; Speed, 22½ knots ; Completed, 1914-15.
 Armament, 12—12-in. ; 12—6-in. ; 4—3-pr. ; 6 M. ; 4 L. ; 2 submerged 21-in. torpedo tubes.

Guns on B and X turrets replaced by rangefinders.

ARGENTINE.

CRUISERS.

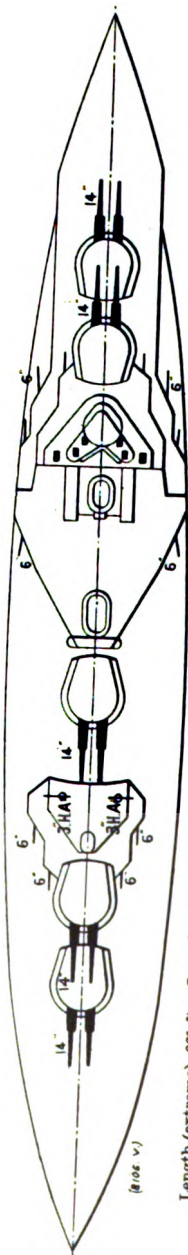
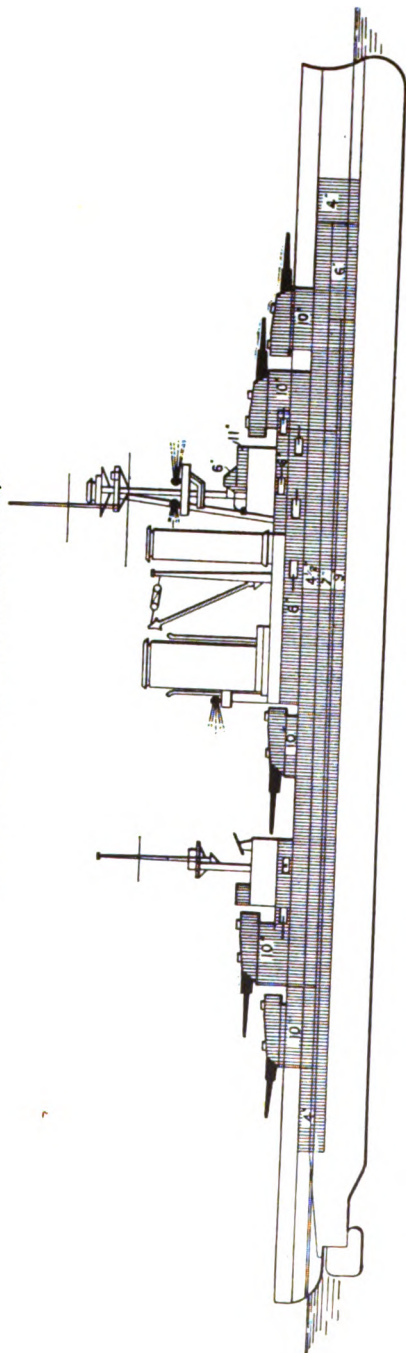
Almirante Brown. 25 Maio.



Length (extreme), 545 ft.; 3,495 tons. Speed, 32 knots. Completed, 1931.
 Armament, 6—7.5-in. A.A.; 12—4-in. A.A.; 6 Pom Poms; 6 21-in. torpedo tubes;
 1 catapult; 2 seaplanes.
 Correction to plan.—Fore topmast shortened. Main topmast lengthened.
 Derrick fitted on fore side of mainmast.

CHILE.

BATTLESHIP.

Almirante Latorre (*formerly* H.M.S. Canada).

Length (extreme), 661 ft. ; Length B.P., 625 ft. ; 33,300 tons ; Speed, 23 knots ; Completed, 1915 ; Modernised at Devonport Dockyard, 1922-31.*
 Armament, 10-14-in. ; 14-6-in. ; 14-6-in. ; 4-3-pr. ; 2-3-in. A.A. ; 4-3-pr. ; 4 submerged 21-in. torpedo tubes ; 1 catapult.

* During modernisation main topmast has been raised and bridge platforms extended.

Four 4-in. A.A. have been added.

Catapult fitted on quarter deck.

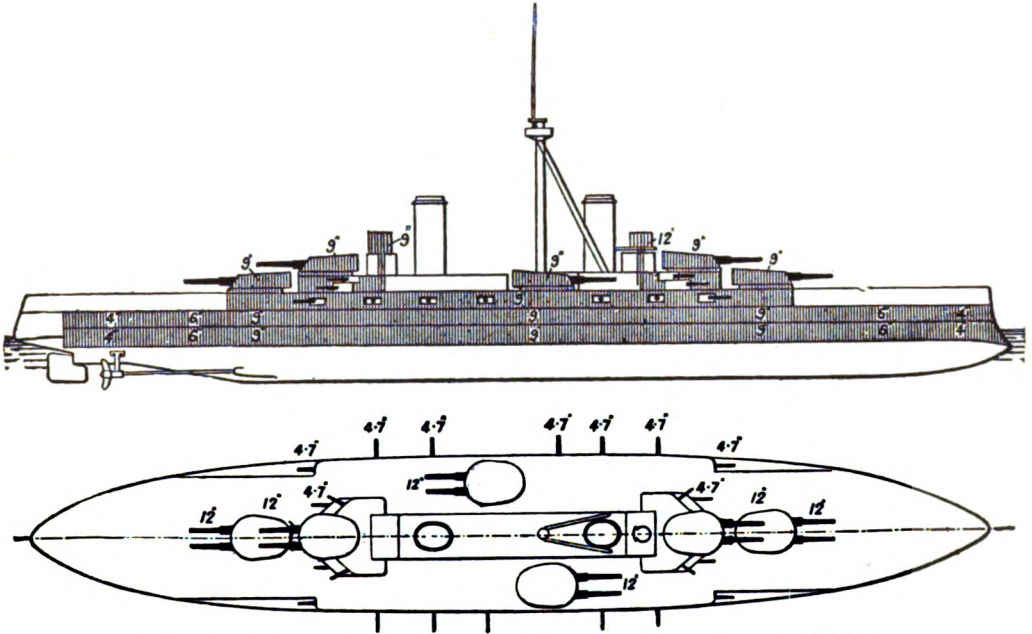
(P59)

BRAZIL.

BATTLESHIPS.

Minas Geraes.

São Paulo.



Length (extreme), 543 ft. ; Length B.P., 500 ft. ; 19,200 tons ; Speed, 21 knots ; Completed, 1909, 1910.
Armament, 12—12-in. ; 12—4.7-in. ; 6—3-pr. ; 2—3-in. A.A. ; 4 M.

Overhauled and refitted at Brooklyn Navy Yard, 1921-22, and A.A. guns installed.

Corrections to plan.—Ten main deck 4.7-in. guns removed in 1931.

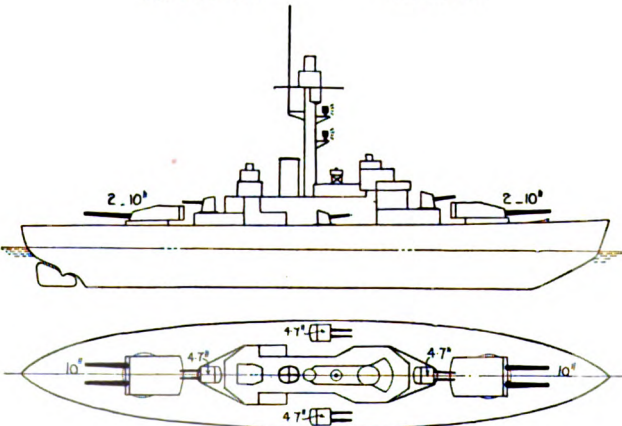
Minas Geraes reconstructed, 1938. Forward funnel removed, bridgework modified ; 2—4.7-in. guns and 2—3-in. A.A. guns added.

FINLAND.

ARMoured GUNBOATS.

Väinämöinen.

Ilmarinen.

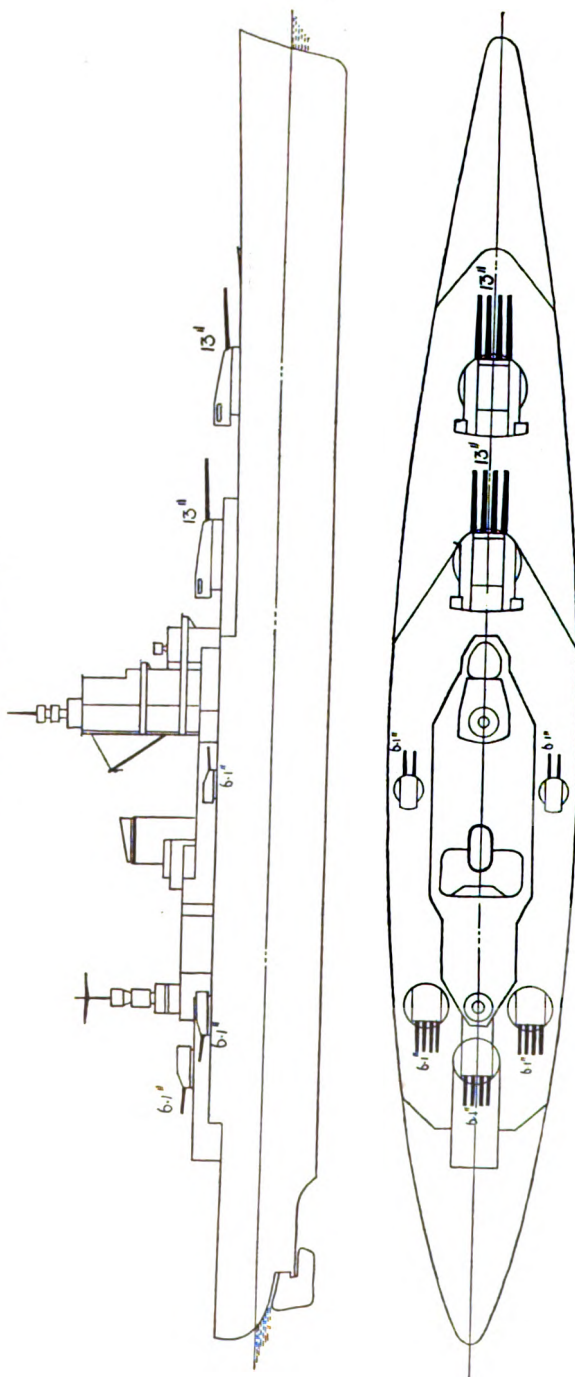


Length, 305 ft. ; 4,000 tons ; Speed, 15 knots.

Armament, 4—10-in. ; 8—4-in.

Completed, 1932-33.

FRANCE.
BATTLESHIPS.
Dunkerque. Strasbourg.



Length, 706 ft.; 26,500 tons; Speed, about 29 knots. Completed, 1936.

Armament, 8-13-in.; 16-5.1-in., 40 smaller; 1 catapult: 4 aircraft.

Catapault fitted on quarter deck at M.L., and crane fitted on port side at break of deck.

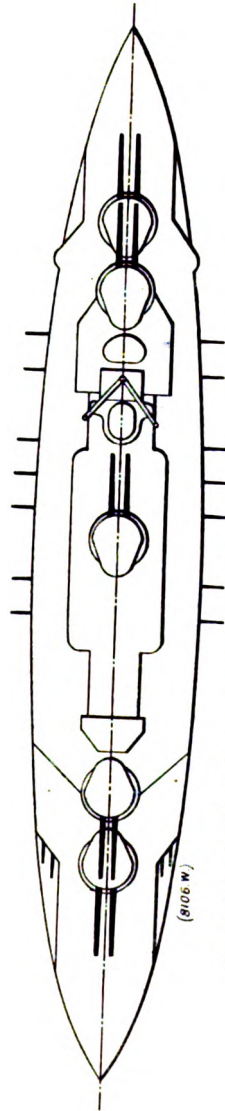
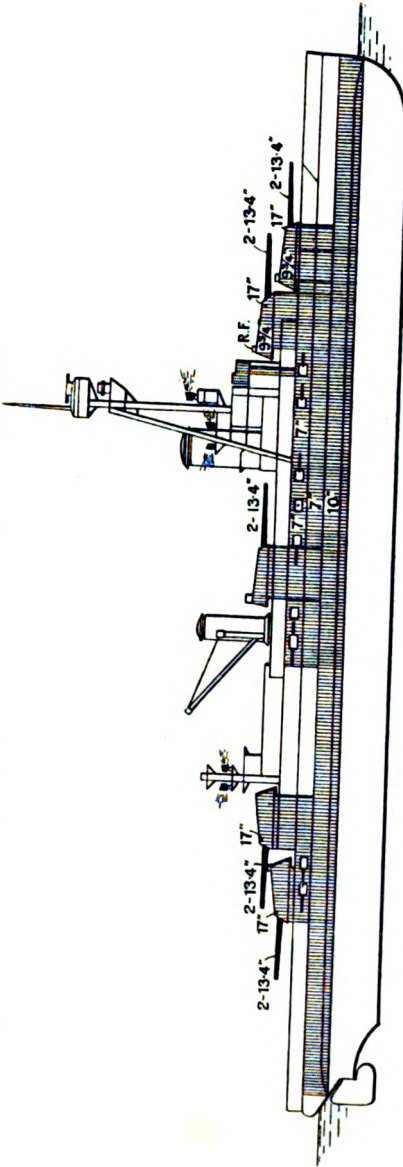
FRANCE.

BATTLESHIPS.

Bretagne.

Lorraine.

Provence.



Length (extreme), 544 ft. 6 ins. ; 22,180 tons ; Speed, 20 knots ; Completed, 1915-16 ; Modernised, 1925-27.
 Armament, 10—13.4-in. ; 14—6.4-in. ; 8—3-in. A.A. ; 5—3-pr. ; 2—1-pr. ; 4 submerged 18-in. torpedo tubes.

Correction to plan.—The ships have now tall main topmasts and no fore topmasts.
 NOTE.—Lorraine has been reconstructed. The midships turret has been removed and a hangar fitted in its place. Machinery is modernised and speed increased. Improved protection is fitted. 8—3.9-in. A.A. fitted in lieu of 3-in. A.A.'s. 2—13.4-in. guns removed.

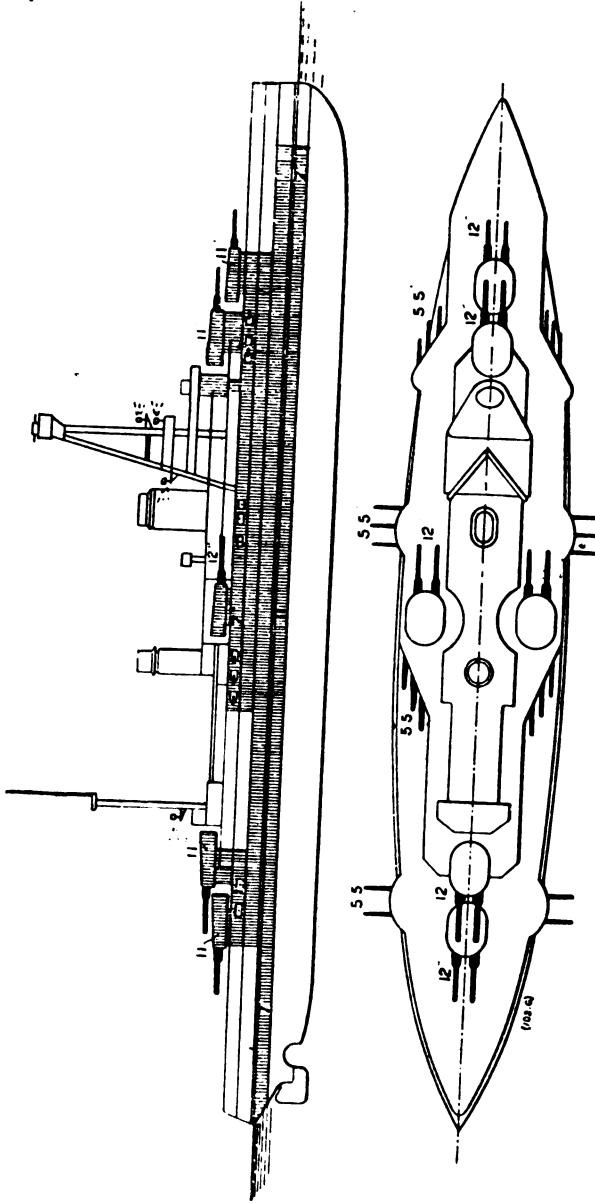
Cranes fitted abreast funnel. Bridgework extended.

FRANCE.

BATTLESHIPS.

Courbet.

Paris.



Length (extreme), 544 ft. 6 ins. ; Length B.P., 541 ft. 4 ins. ; 22,189 tons ; Speed, 20 knots ; Completed, 1913-14. Modernised in 1929.
 Armament, 12-12-in. ; 22-5.4-in. ; 7-8-in. A.A. ; 4-8-pr. (Courbet has 2-8-pr.) ; 2-1-pr. ; 4 submerged 18-in. torpedo tubes.
 Corrections to plan.—Cruciform fitted abreast after funnel. After funnel reduced in height.

FRANCE.

CRUISERS.

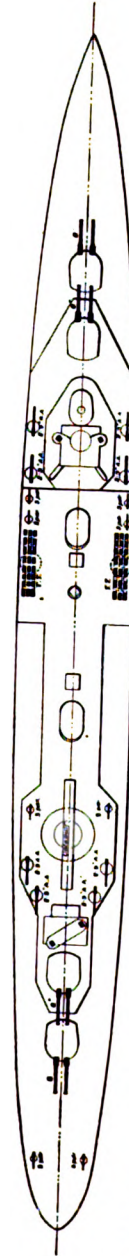
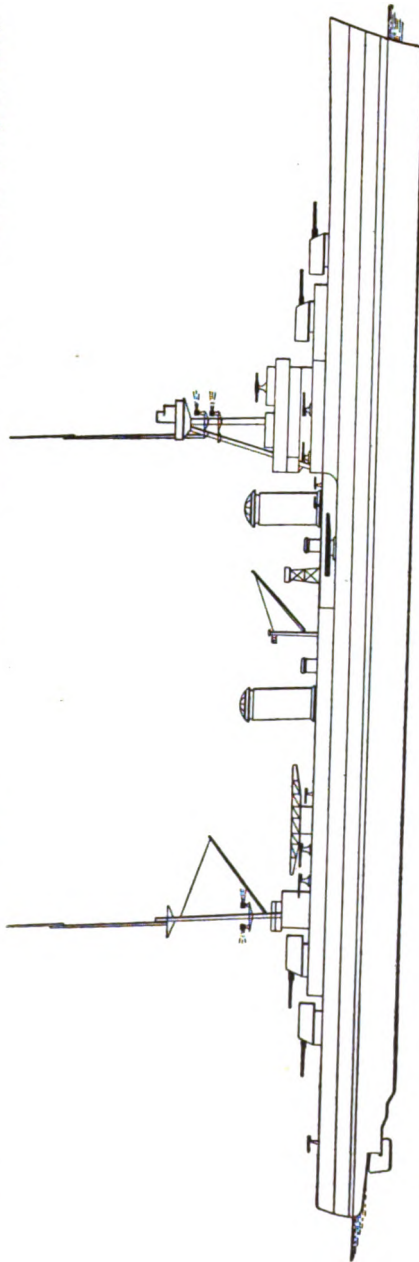
Duquesne. Tourville. ("Duquesne" Class.)

Suffren.

Foch.

Colbert.

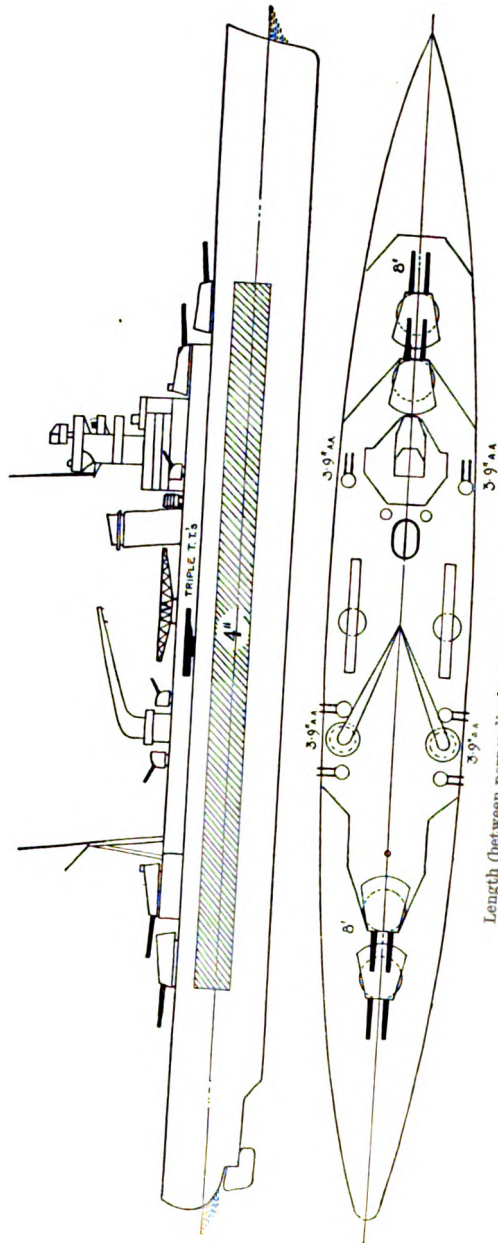
Dupleix. ("Suffren" Class.)



Length (between perpendiculars), 607 ft. (Duquesne and Tourville (extreme), 626 ft. 8 in.); 10,000 tons; Speed, 32 knots (Duquesne and Tourville, 33-2 knots). Armament, 8-8-in., 8-8-in. A.A. (Dupleix, Colbert and Foch have 8-3.5-in. A.A.); 8-1-pr.; 2-triple 21-in. T.T.'s.

The above plan is for Duquesne and Tourville. The others differ slightly from this in details of bridges, cranes, catapults, etc. Suffren has 2 catapults in the position shown above. Colbert, Dupleix and Foch have tripod mainmasts, 2 catapults between the funnel and the two cranes abreast the after funnel; fore topmasts removed in Dupleix and shortened in Duquesne, Tourville and Foch.

FRANCE.
CRUISER.
Algérie.



Length (between perpendiculars), 607 ft. ; 10,000 tons ; Speed, 31 knots.
Armament, 8—8-in. ; 12—3.9-in. A.A. ; 8—1.5-in. ; 16 M. ;
1 catapult ; 2 seaplanes.

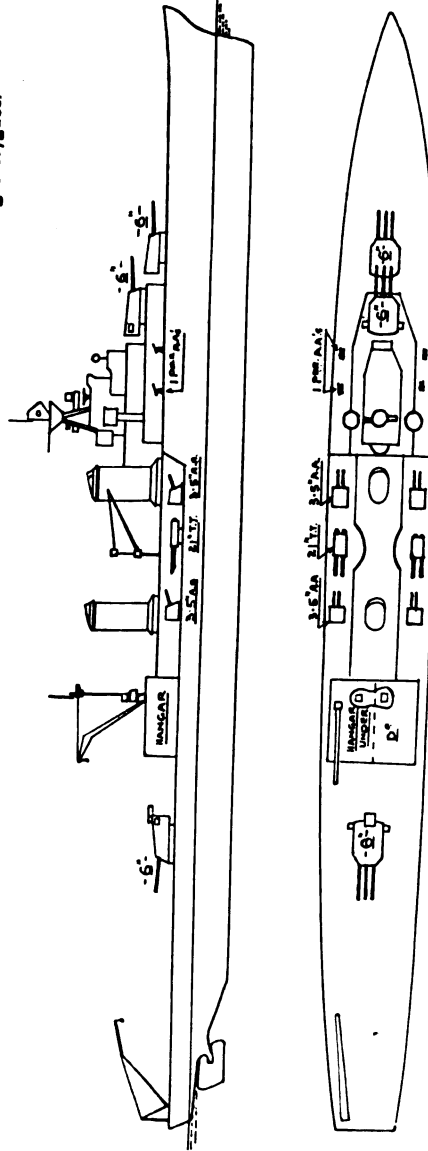
Correction to plan.—The aircraft cranes are not sided as shown, but lie fore and aft from a structure on the middle line between funnel and mainmast.

Superstructure amidships modified and two cranes fitted.

FRANCE.

CRUISERS.

Jean-de-Vienne.	La Galissonnière.	Marseillaise.	Gloire.
			Montcalm.
			Georges Leygues.



Length (extreme), 590 ft.; 7,600 tons; Completed, 1935 37; Speed, Jean-de-Vienne and La Galissonnière 31 knots, others 32½ knots.
 Armament, 9—6-in.; 8—5.6-in. A.A.; 8—1-pdr. A.A.; 4—21-in. torpedo tubes; 2 seaplanes; 1 catapult.
 Fitted with Hein landing canvas at the stern.

FRANCE.

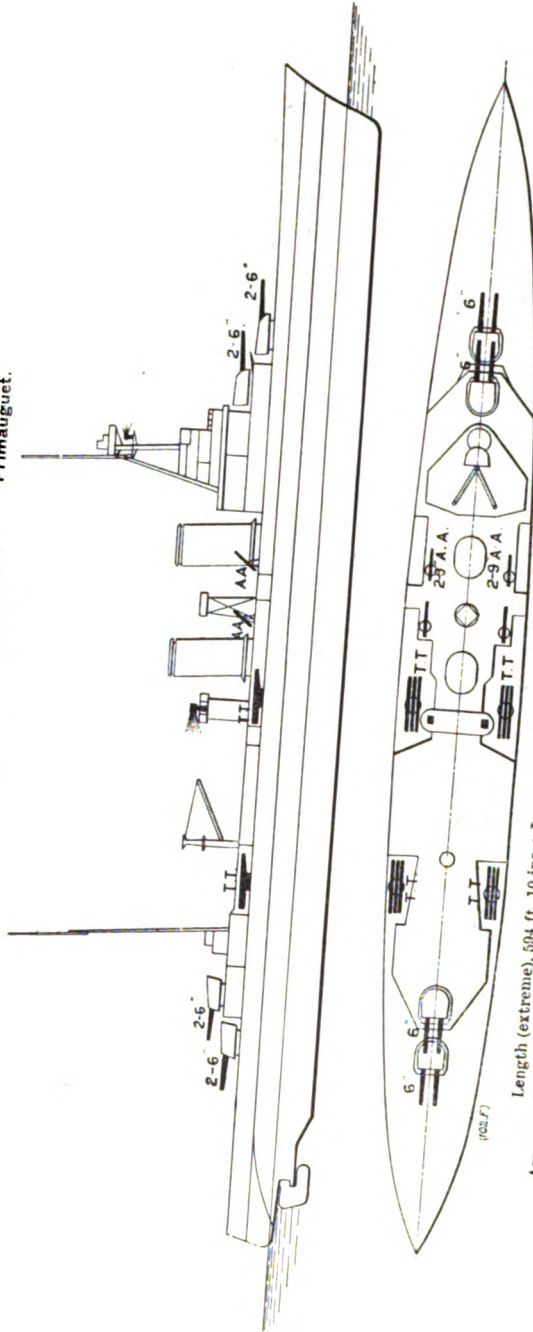
CRUISERS.

"Duguay-Trouin" Class.

La Motte Picquet.

Duguay-Trouin.

Primauguet.



Length (extreme), 504 ft. 10 ins.; Length B.P., 575 ft.; 7,249 tons; Speed, 33 knots. Completed, 1926-27.
 Armament, 8-6.1-in.; 4-3-in. A.A.; 2-3-pr.; 2 M.; 1 L.; 4 triple torpedo tubes (21.7-in. torpedoes); catapult; 2 seaplanes.

NOTE.—Reported to have protection to magazines.

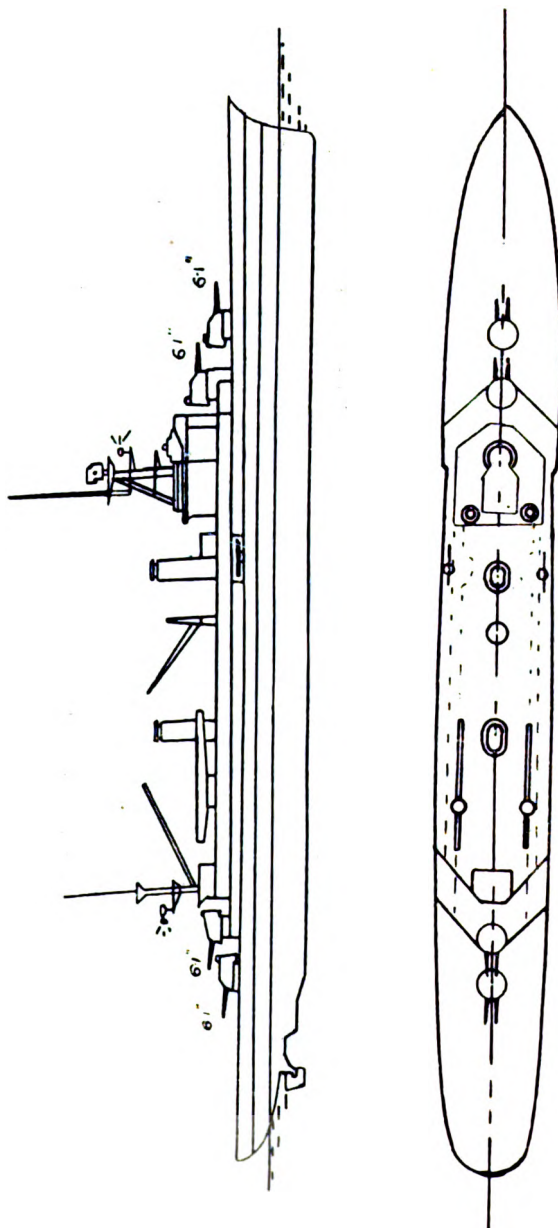
Correction to plan.—Catapult is fitted on quarter deck.

Fore topmast removed and masthead modified.

FRANCE.

TRAINING CRUISER.

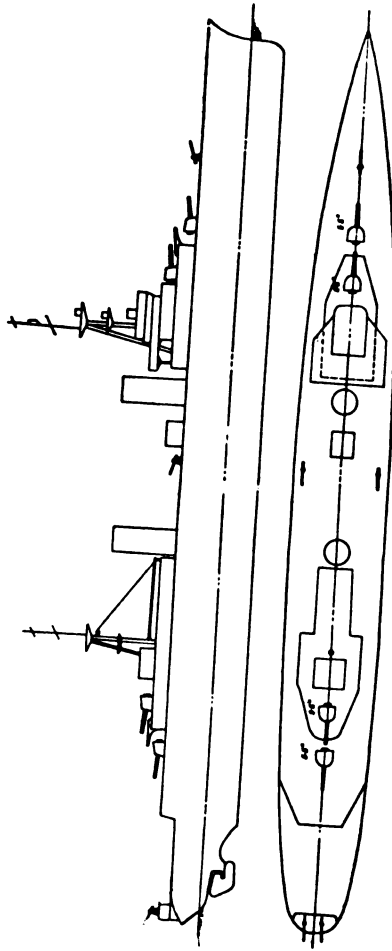
Jeanne d'Arc.



Length (extreme), 557 ft. 8 ins. ; 6,496 tons ; Speed, 26 knots ; Completed, 1931.
Armament, 8—6'1-in. ; 4—3-in. A.A. ; 2—1'5-in. ; 2 M. ; 2—21'7-in. torpedo tubes ;
2 seaplanes.

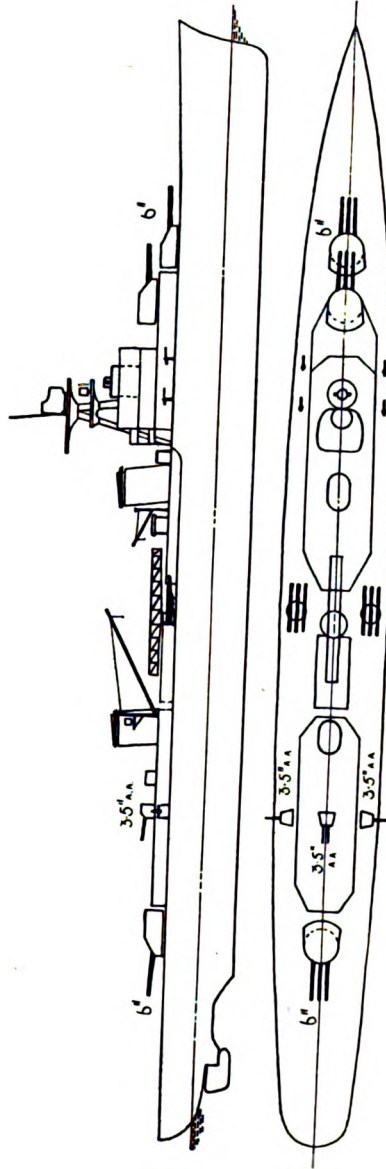
Correction to plan.—The catapults have been removed.

FRANCE.
CRUISER MINELAYER.
Pluton.



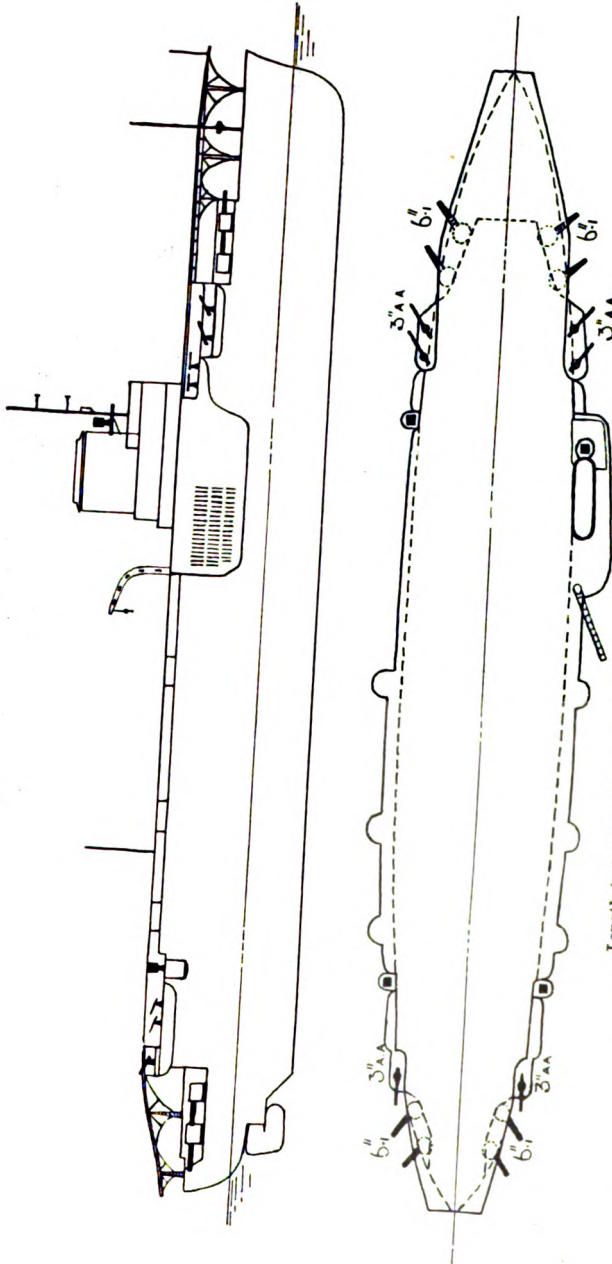
Length (extreme), 500 ft. 4 ins. ; 4,773 tons ; Speed, 30 knots ; Completed, 1891.
Armament, 4—6.5-in. ; 4—3-in. A.A. ; 2—1 pdr. ; 12 M. ; 200 mines.
Correction to plan.—Fore topmast shortened.
Guns removed from stern. Two A.A. mountings added on fore side of X turret.
Small gun on M.L. forward, replaced by two A.A. mountings.

FRANCE.
CRUISER MINELAYER.
Emilé Bertin.



Length (extreme), 180 ft. 9 ins. ; 5,886 tons ; Speed, 34 knots Completed, 1934.
Armament, 9-6-in. ; 4-3.5-in. A.A. ; 4-1.5 A.A. ; 8 M. ; 200 mines ; 6-21.7-in. torpedo tubes ; 1 catapult ; 2 aircraft.
Correction to plan. —Small pole mast fitted on fore side of after turret.

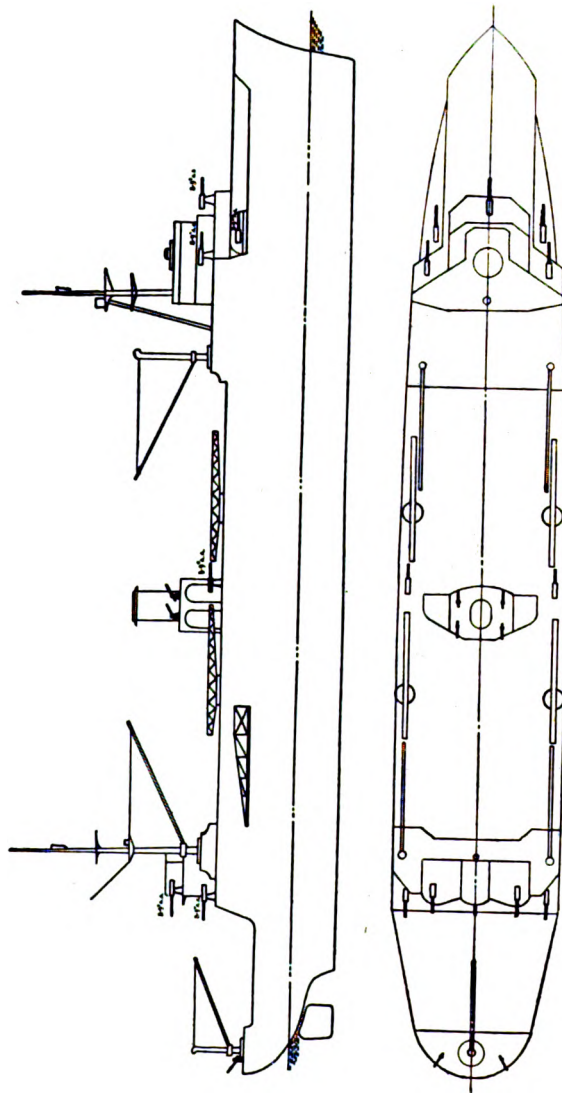
FRANCE.
AIRCRAFT CARRIER.
Béarn.



Length (extreme), 599 ft. ; 22,146 tons ; Speed, 21.5 knots ; Completed, 1923.
Armament, 8—6.1-in. ; 6—3-in. A.A. ; 8—1-pr. A.A. ; 12 M. A.A. ; 4—21.7-in. torpedo tubes ; 41 planes.

Correction to plan.—Space between flight deck forward and upper deck partially blanked off. Framework fitted to after-side of funnel.

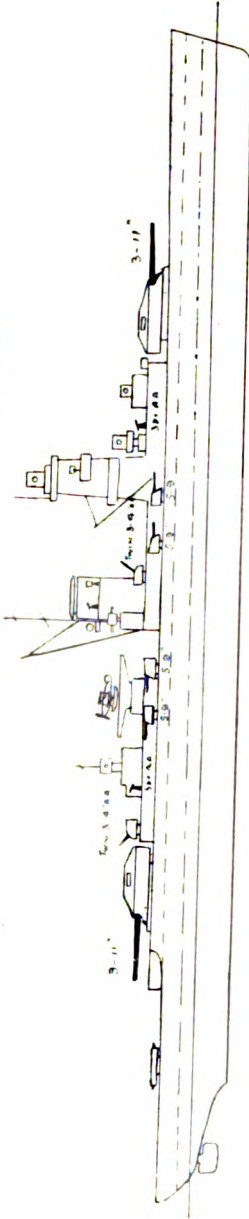
FRANCE.
AVIATION TRANSPORT.
Commandant Teste.



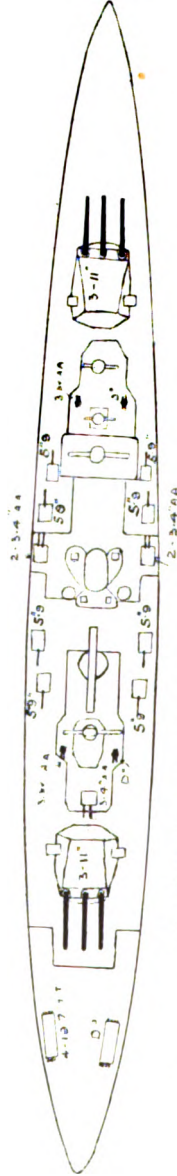
Length (extreme), 548 ft. 10,000 tons; Speed, 20½ knots; Completed, 1932.
Armament, 12 -3·9-in. A.A.; 9—3-pdr. A.A.; 12 M.; 19 planes.

GERMANY.
ARMoured SHIPS.

Admiral Scheer.

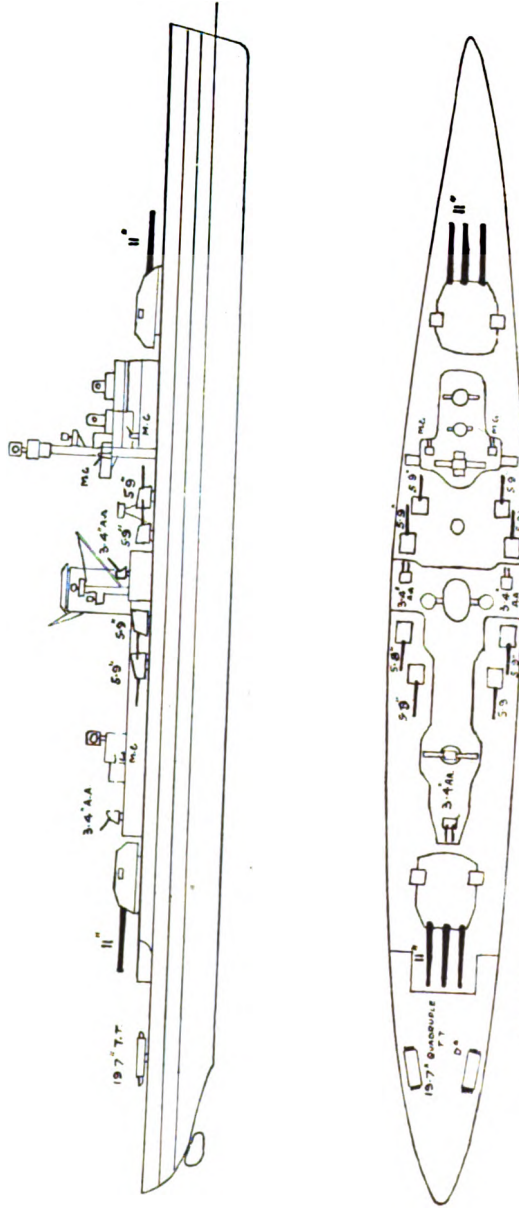


Admiral Graf Spee.



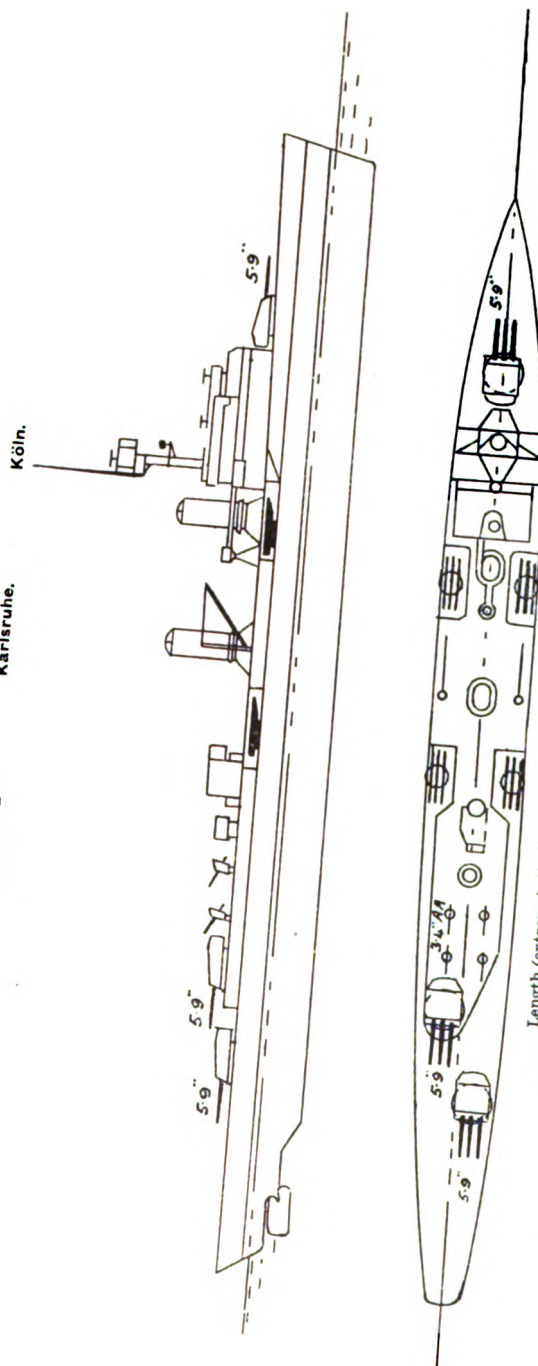
Length (extreme), 609 ft. 3 ins. ; Standard displacement, 10,600 tons ; Speed, 28 knots.
Armament, 6-11-in. ; 8-6-in. ; 6-4-1-in. A.A. ; 8-1-5-in. A.A. ; 10 M.G. ; 8-21-in. torpedo tubes ; 1 catapult ; 2 aircraft.
Admiral Scheer completed, 1935 ; Admiral Graf Spee completed, 1936.
Correction to plan — Graf Spee has a pole mast shaft tower.

GERMANY.
ARMoured SHIP.
Deutschland.



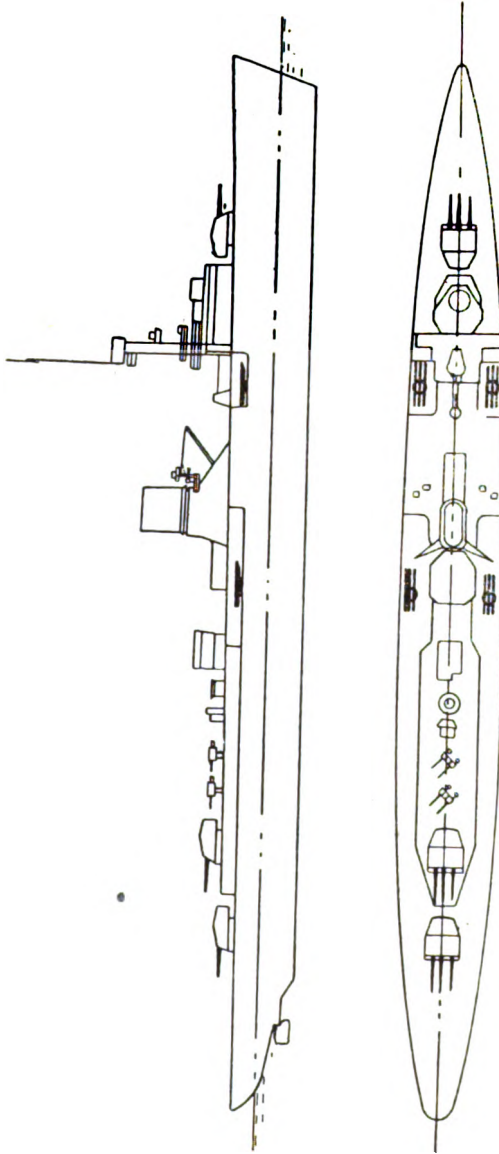
Length (extreme), 609 ft. 3 ins. ; Standard displacement, 10,000 tons ; Speed, 26 knots ; Completed, 1933.
Armament, 6—11-in. ; 8—5.9-in. ; 6—4.1-in. A.A. ; 8—1.5-in. A.A. ; 10 M.G. ; 8—21-in. torpedo tubes ; 1 catapult ; 2 aircraft.
Fore mainmast fitted on aft side of funnel. Catapult fitted abaft funnel. Fore topmast fitted.

GERMANY.
LIGHT CRUISERS.
Königsberg.
Karlsruhe.
Köln.



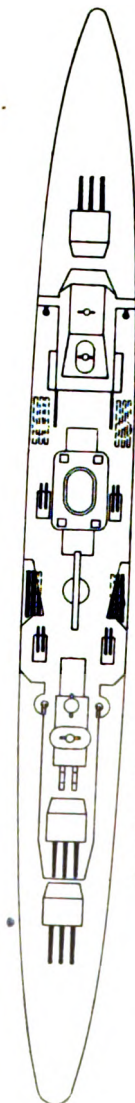
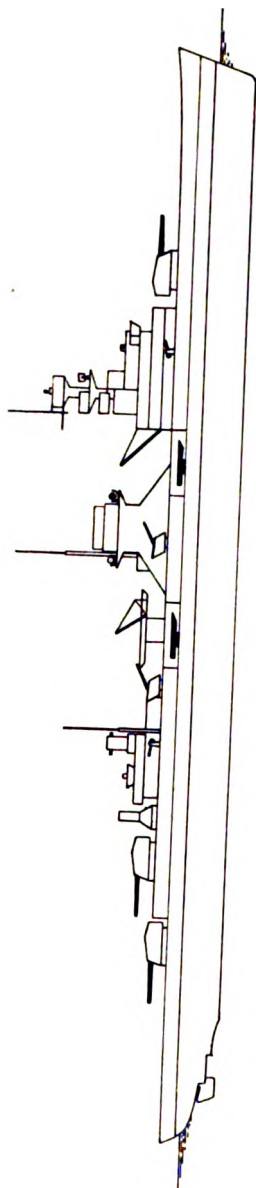
Length (extreme) 570 ft. 10 ins. ; 6,000 tons ; Speed, 32 knots ; Completed, 1923-30.
Armament, 9—5.9-in. ; 4—3.5-in. A.A. ; 4 triple 21-in. torpedo tubes ; 1 catapult ; 2 aircraft.
Pole mainmast fitted on aft side of after funnel. Catapult fitted between funnels. Crane fitted in lieu of derrick on port side.

GERMANY.
LIGHT CRUISER,
Leipzig



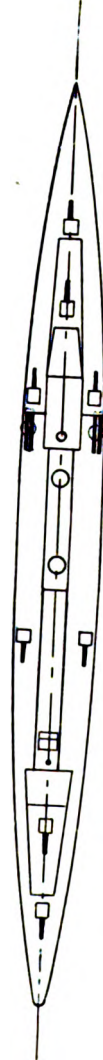
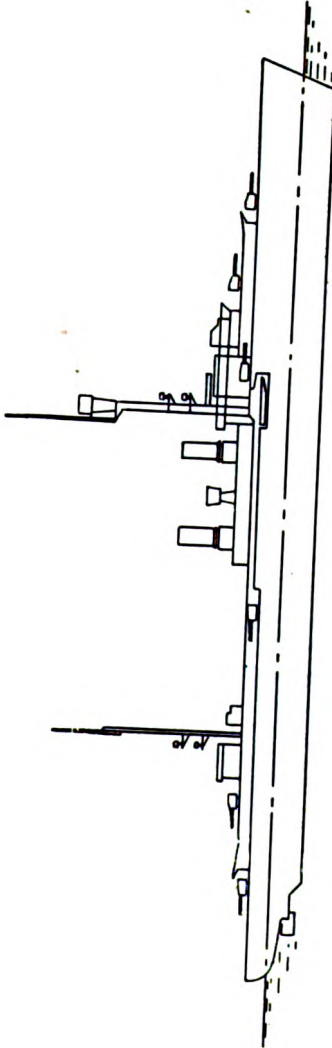
Length (extreme) 580 ft. ; length W.L., 543 ft. 10 ins. ; 6,000 tons ; Speed, 32 knots ; Completed, 1931.
Armament, 9—5·9-in. ; 8—3·5-in. A.A. ; 8—1·5-in. A.A. ; 4 triple 21-in. torpedo tubes ; 1 catapult ; 2 aircraft.
Corrections to plan.—Pole mainmast fitted on aft side of funnel. Catapult fitted between funnel and foremast.
The derrick is fitted on the starboard side. A crane is fitted on port side nearest funnel.

GERMANY.
LIGHT CRUISER.
Nurnberg.



Length (on W. L.), 557 ft. 9 ins.; 6,003 tons; speed, 32 knots; completed, 1935.
Armament, 9—5.9-in. ; 8—3.5-in. H. A. ; 8—1.5-in. A. A. ; 12—21-in. torpedo tubes ; 1 catapult ; 2 seaplanes.

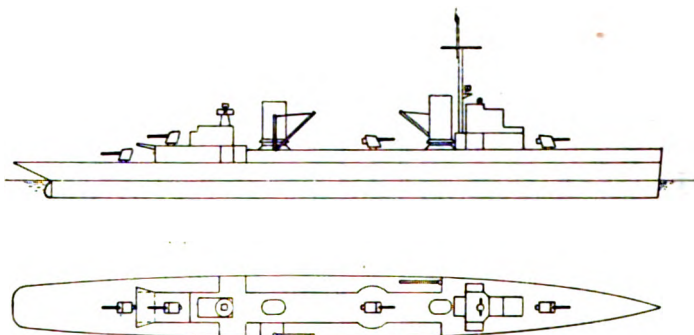
GERMANY.
LIGHT CRUISER.
Emden.



Length (extreme), 510 ft. 2 ins.; 5,400 tons; Speed, 29 knots; Completed, 1925.
Armament, 8—5.9-in.; 3—8.5-in. A.A.; 4-M.G.; 4—19.7-in. torpedo tubes in twin mountings.
The 5.9-in. guns are in twin mountings, 2 forward and 2 aft.
Corrections to plan.—Fore topmast shortened. Pole mast fitted to aft side of funnel.
Superstructure added before mainmast. Mainmast shortened and surmounted by a searchlight platform.

(P78)

GERMANY.
GUNNERY TRAINING SHIP.
Bremse.

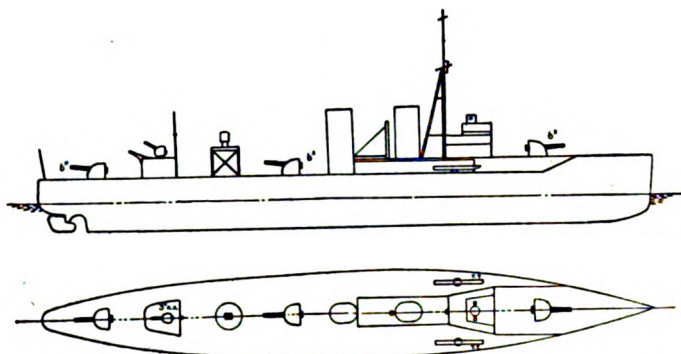


Length (extreme), 339 ft. 6 ins. ; speed, 27 knots ; 1460 tons ; completed, 1932.
Armament. 4—4-1-in.

GREECE.

CRUISER.

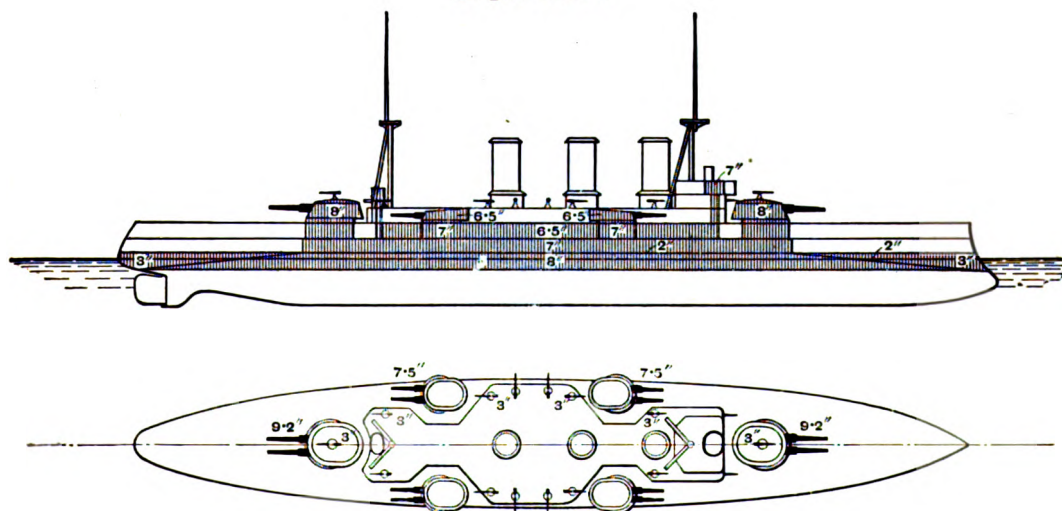
Helle.



Length, 322 ft. ; 2,083 tons ; Speed, 20 knots ; Completed, 1914 ; Reconstructed, 1929.
Armament, 3—6-in. ; 1—3-in. A.A. ; 100 mines ; 2—18-in. torpedo tubes.

ARMOURD CRUISER.

Giorgios Averoff.



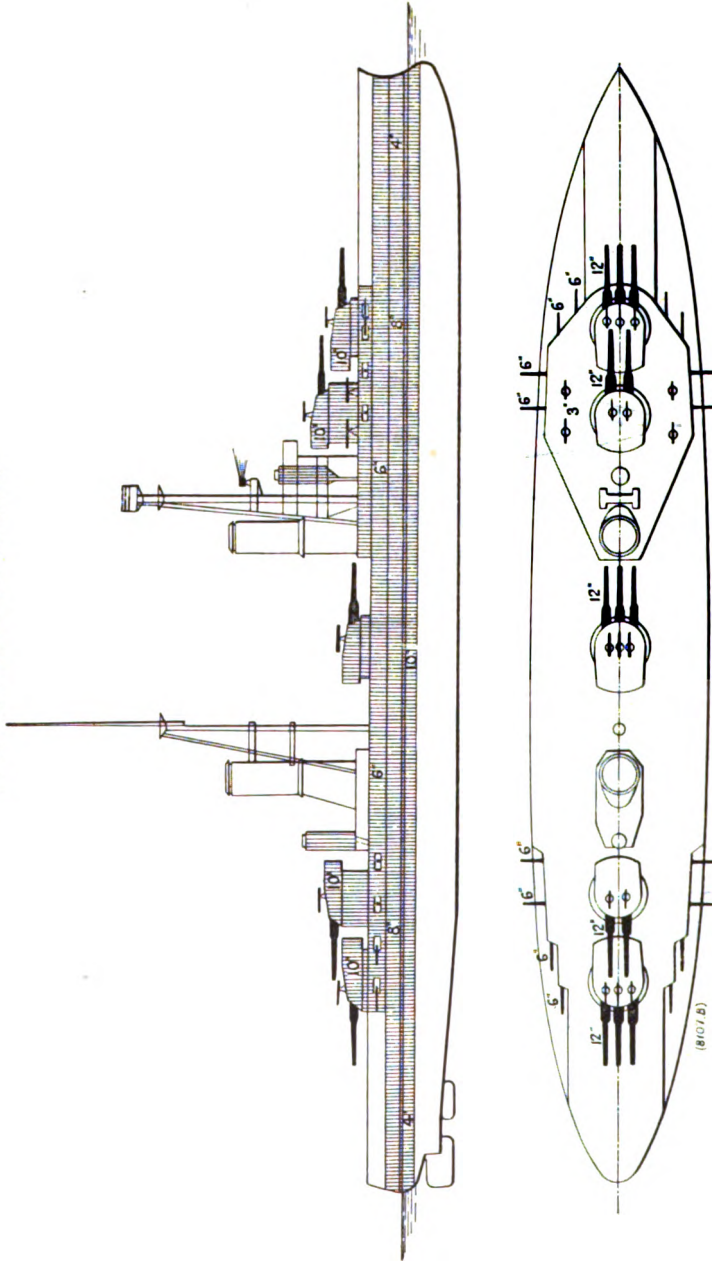
Length, 462 ft. ; 9,301 tons ; Speed, 22·5 knots ; Completed, 1911. Refitted, 1927.
Armament, 4—9·2-in. ; 8—7·5-in. ; 16—3-in. ; 2—3-in. A.A. ; 4—5-pr. ; 2 M. ; 3 submerged 18-in. torpedo tubes.
Correction to plan.—Bridgework modified. Control top fitted on foremast.

ITALY

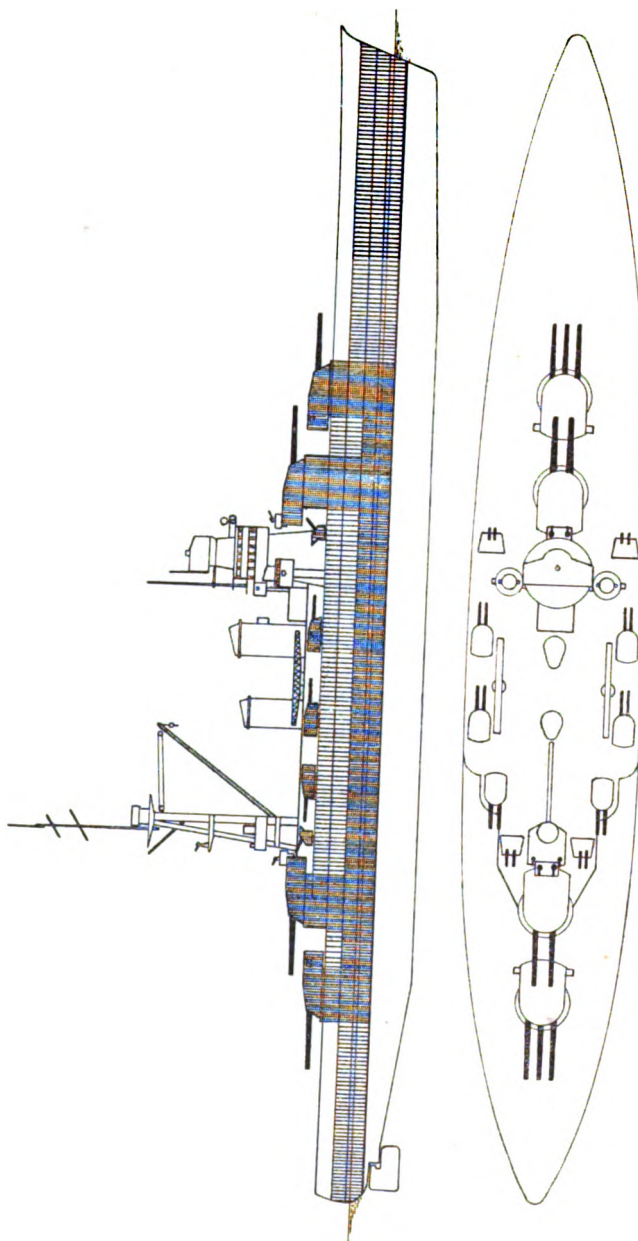
BATTLESHIPS.

Andrea Doria. **Caio Duilio.**

Before modernisation. See note below.

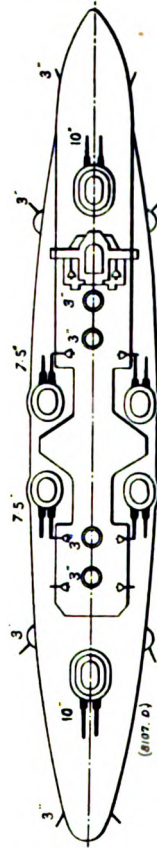
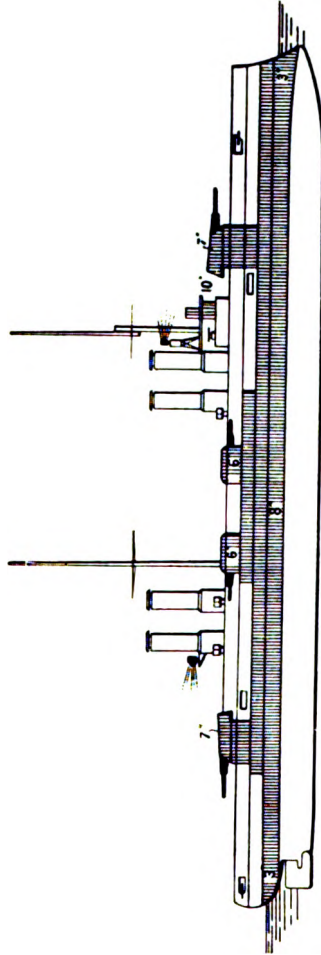


ITALY.
BATTLESHIPS.
Conte di Cavour. **Giulio Cesare.**
After modernisation.



Length (extreme), 611 ft. 6 ins. ; 23,622 tons ; 27 knots ; completed, 1914-15 ; modernised, 1937.
Armament, 10—12·6 in. ; 12—4·7 in. ; 8—3·9 in. A.A. ; 20 A.A. M.G. ; 4 aircraft ; 2 catapults.

ITALY.
CRUISER.
S. Giorgio.



Length (extreme), 462 ft. 2 ins. ; Length B.P., 429 ft. 10 ins. ;

Speed, 22 knots; 9,232 tons; Completed, 1910.
Armament, 4—10-in.; 8—7·5-in.; 10—3-in.; 6—3-in. A.A.; 2—3-pr.; 6 M.; 2 L.; 2—18-in. torpedo tubes.

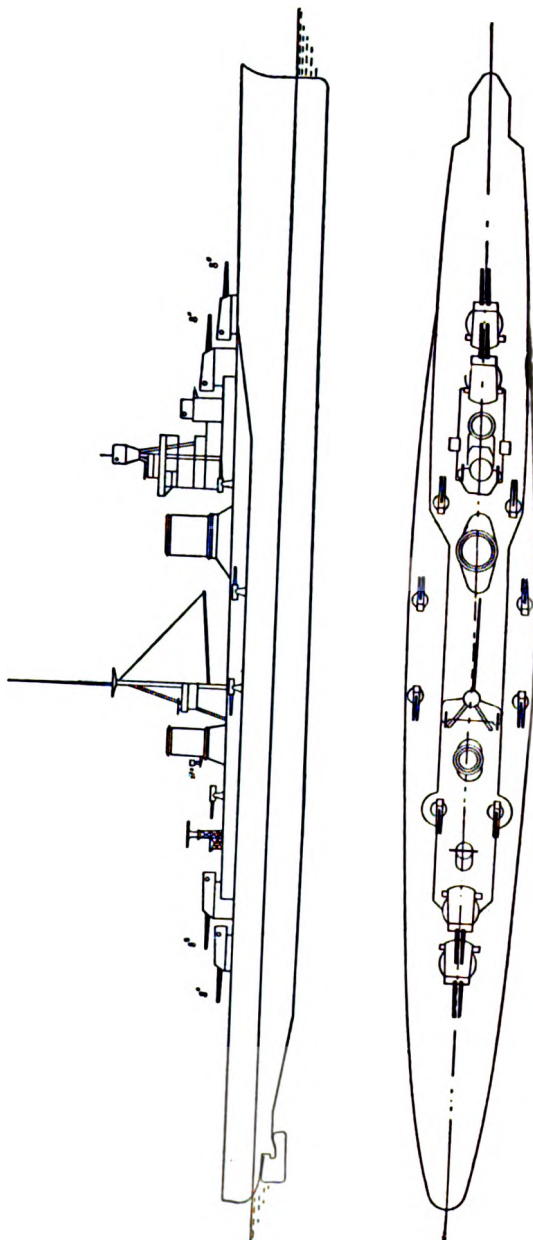
* Classified as a Battleship, 2nd class, in Italian official tests.

ITALY.

CRUISER.

Modified "Trento" Class.

Bolzano.



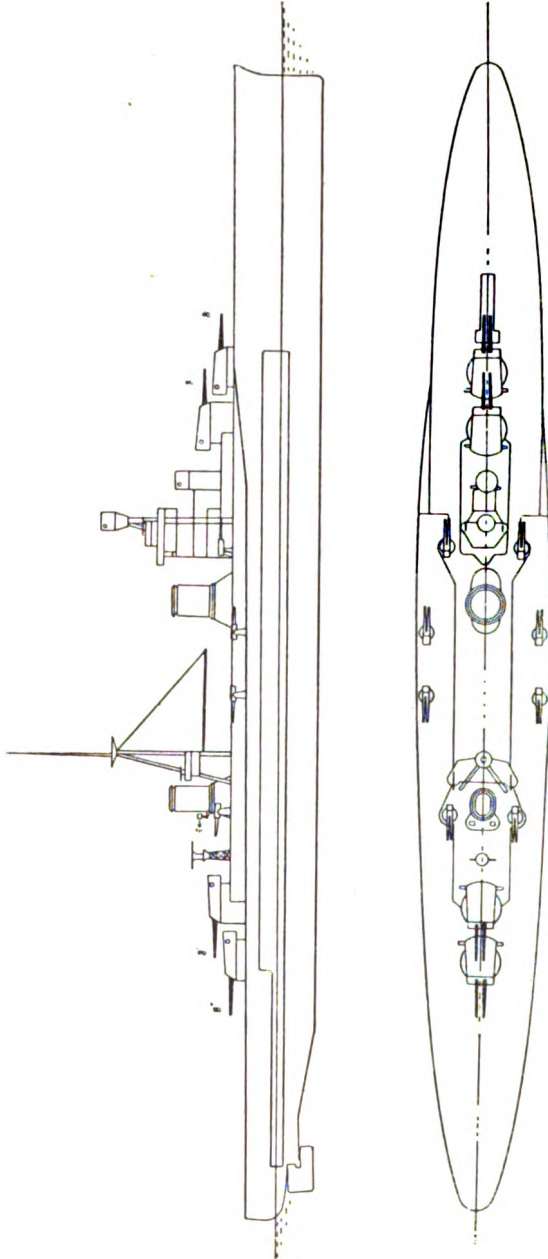
Length (extreme) 646 ft. 3 ins.; 10,000 tons; Completed, 1932; Speed, 35 knots.
Armament, 8—8-ins.; 16—3·9-in. A.A.; 8—1·5 M.A.A.; 8—5 M.A.A.; 1 catapult; 2 aircraft; 4—21-in. torpedo tubes.
Corrections to plan.—Forward superstructure faired into funnel. Clinker screens fitted to funnels. Catapult fitted amidships.

ITALY.

CRUISERS.

"Zara" Class.

Pola. Zara. Fiume. Gorizia.

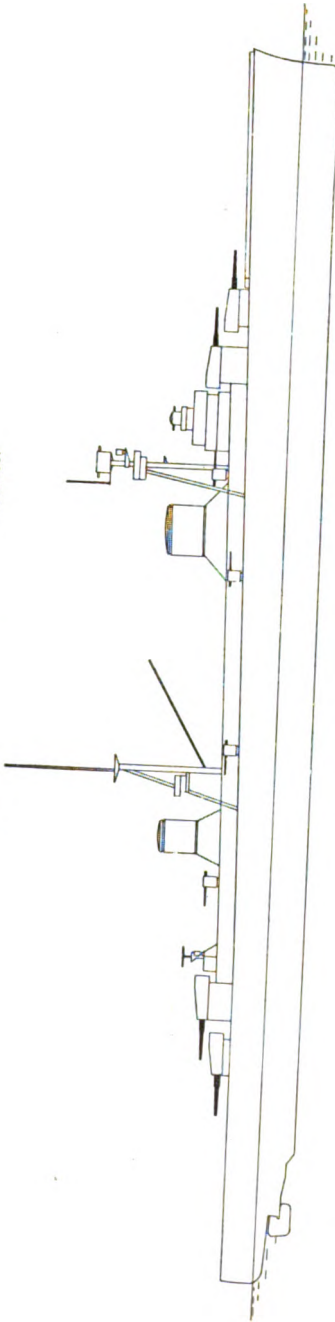


Length (extreme), 599 ft. 9 ins. ; 10,000 tons ; Speed, 32 knots.
Armament, 8—8-in. ; 12—3·9-in. ; 8—1·5-in. A.A. ; 8—·5 M.A.A. ; 1 catapult ; 2 aircraft.
Corrections to plan.—Forward superstructure faired into funnel. Clinker screens fitted to funnels.

ITALY.
CRUISERS.
"Trento" Class.

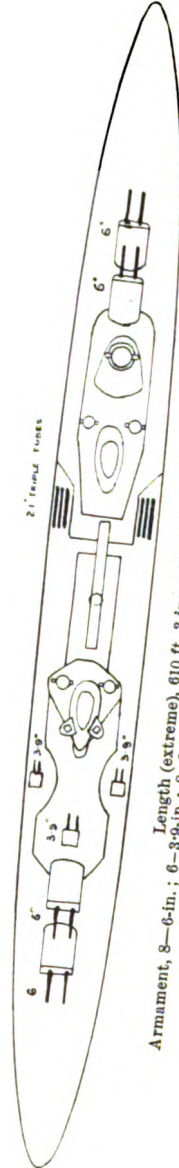
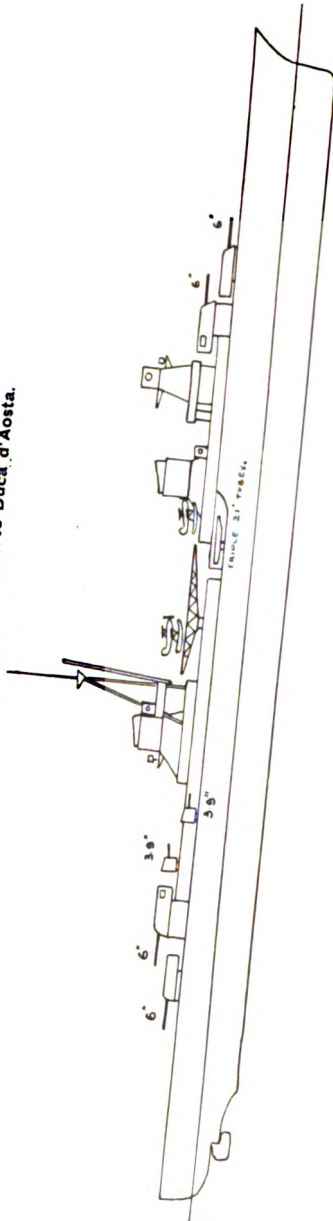
Trento.

Trieste.



Length (extreme), 646 ft. 2 ins.; 10,000 tons; Speed, 35 knots; Completed, 1922.
Armament, 8—8-in.; 12—3-9-in.; 4—1-57-in. A.A.; 8—5 A.A. M.G.; 4 twin torpedo tubes 21-in.;
1 catapult; 2 aircraft.
Correction to plan.—The 4-in. guns between the funnels are twin guns. Fore topmast removed.

ITALY.
CRUISERS.
"Attentato" Class.
Eugenio di Savoia and Filiberto Duca d'Aosta.

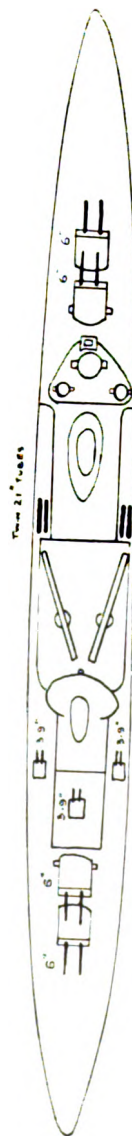
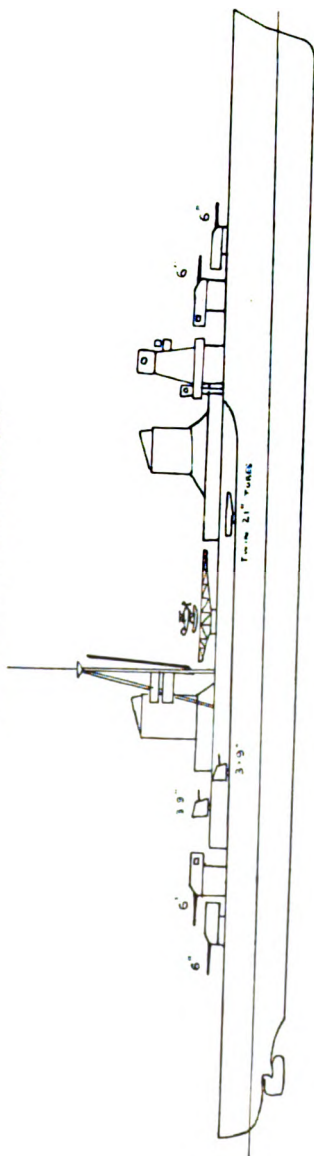


Armament, 8—6-in. ; 6—3.9-in. ; 8—1.5-in. A.A. ; 8—5-in. A.A. ; 2 triple 21-in. torpedo tubes ; 1 catapult ; 3 aircraft.
Length (extreme), 610 ft. 3 ins. ; 7,283 tons ; Speed, 37 knots.

ITALY.
CRUISERS.

"Condottieri" Class.

Montecuccoli and Muzio Attendolo.



Length (extreme), 597 ft. 9 ins.; 6,941 tons; Speed, 37 knots; Completed, 1935.

Armament, 8-6-in.; 6-3-9-in. A.A.; 8-1-5-in. A.A.; 8-5-in. A.A. M.G.; 2 twin 21-in. torpedo tubes; 1 catapult; 2 aircraft.

Correction to plan.—1 catapult fitted on M.L.

ITALY.

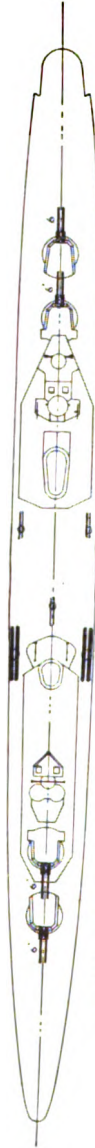
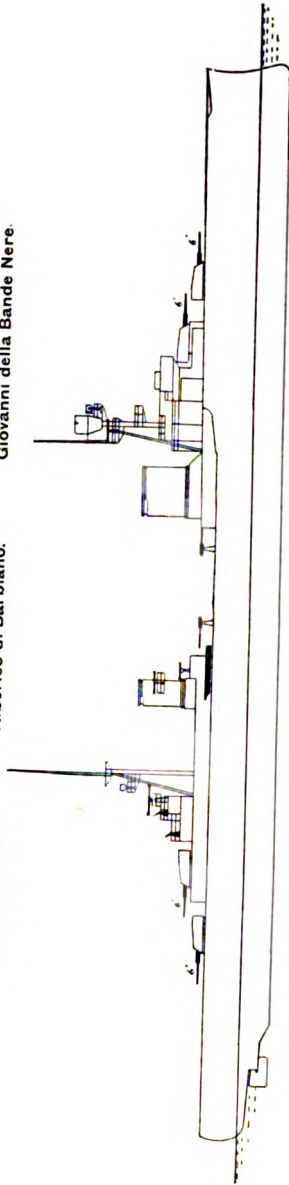
CRUISERS.

"Condottieri" Class.

Armando Diaz.*
Luigi Cadorna.*

Alberto di Quissano.
Alberico di Barbiano.

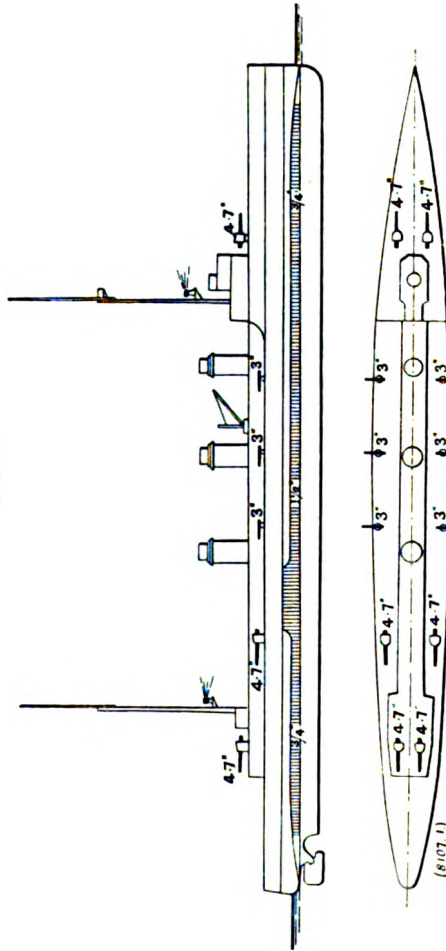
Bartolomeo Colleoni.
Giovanni della Bande Nere.



Length (extreme), 555 ft. 5 ins. ; 5,069 tons * (554 ft. 6 ins., 5,008 tons) ; Speed, 37 knots ; Completed, 1931-33.
Armament, 8-6-in. ; 6-3-9-in. A.A. ; 8-1-5-in. A.A. ; 8-5 in. A.A. M.G. ; 4 torpedo tubes 21-in. ;
1 catapult and 2 seaplanes.

Corrections to plan : The bridge and foremast have been modified.
• In the Armando Diaz and Luigi Cadorna the mainmast is forward of the after funnel, the torpedo tubes are abreast the forward platform, the positions of the twin A.A. guns are reversed, the foremast gun being at forecastle deck level and the two after guns at upper deck level. The catapult is fitted between mainmast and X turret in Diaz and Cadorna ; on forecastle in other ships.

ITALY.
LIGHT CRUISER.*
Quarto.



Length (extreme), 431 ft. 9 ins. ; Length B.P., 413 ft. 5 ins. ; Speed, 28 knots ; 2,903 tons ; Completed, 1913.
Armament, 6—4.7-in. ; 4—3-in. ; 2—1.57-in. A.A. ; 2 above-water 18-in. torpedo tubes ; 126 mines.

* Classified as Scouts in Italian official tests.

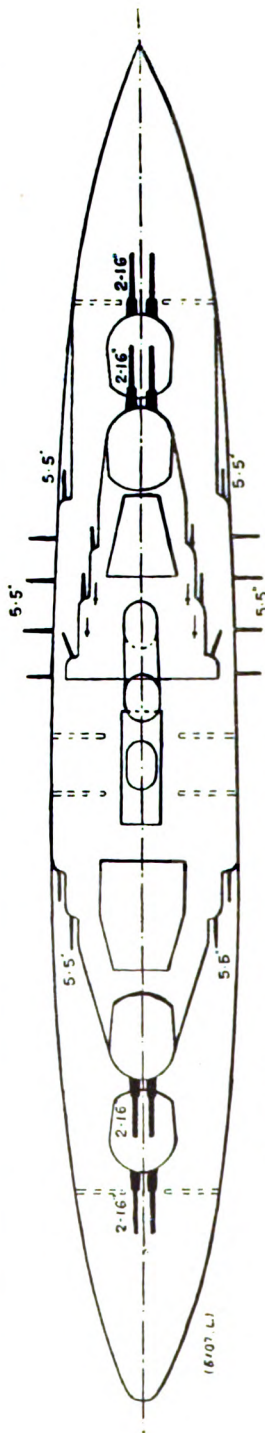
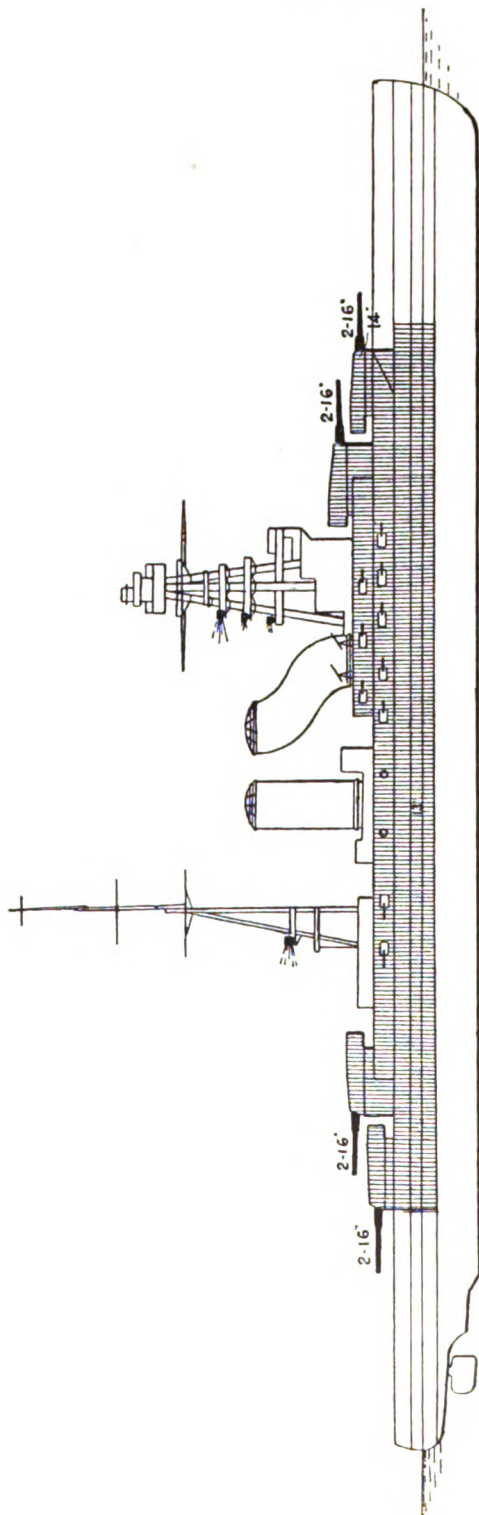
JAPAN.

BATTLESHIPS.

"Nagato" Class.

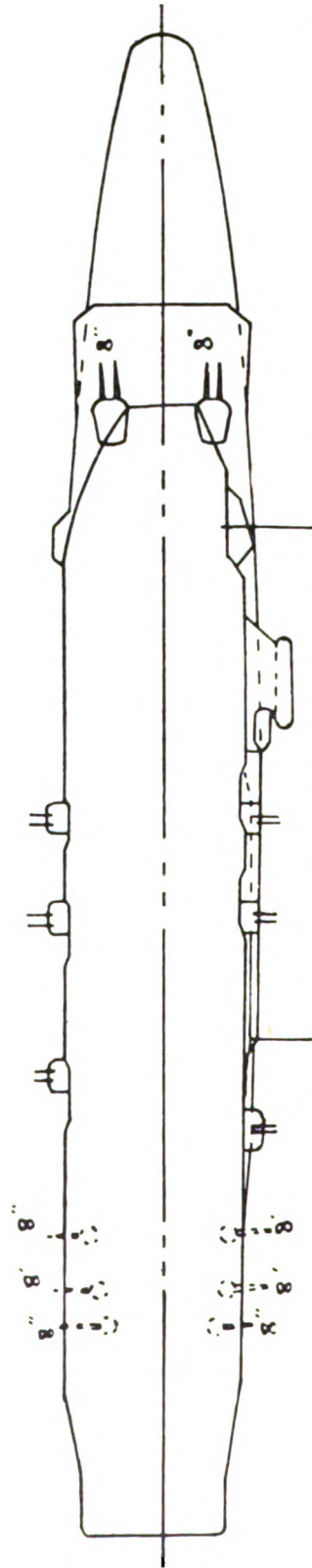
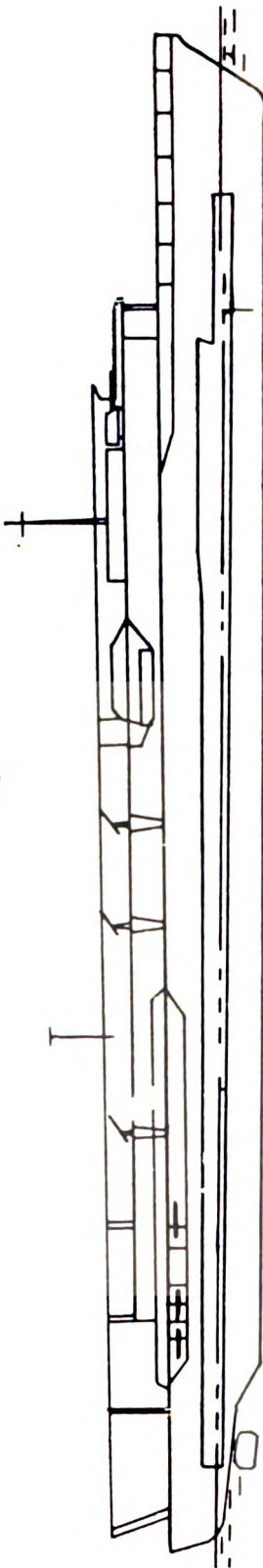
Nagato.

Mutsu.



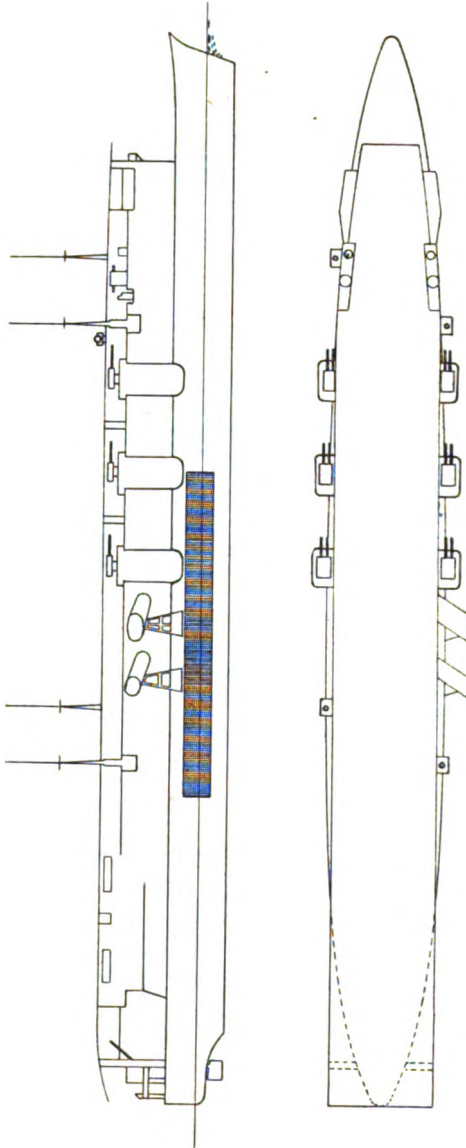
Length (extreme), 700 ft. ; Length B.P., 660 ft. 7 ins. ; Speed, 26 knots ; 32,720 tons ; Completed, 1920-1921.
 Armament, 8-16-in. ; 20-6-6-in. ; 8-6-in. A.A. ; 1 catapult ; 3 aircraft.
 These ships were reconstructed 1935-36, a single funnel being fitted and a catapult added between mainmast and "X" turret.
 Bridgework extended. Superstructure built round mainmast. Main topgallant mast removed

JAPAN
AIRCRAFT CARRIER.
Akagi.



Length (between perpendiculars), 763 ft. ; 26,900 tons ; Speed, 28.5 knots ; Completed, 1927.
Armament, 10—8-in. ; 12—4.7-in. A.A. Accommodation for 50 planes.
Corrections to Plan.—Superstructure added and flight deck extended forward

JAPAN.
AIRCRAFT CARRIER.
Ryujo.



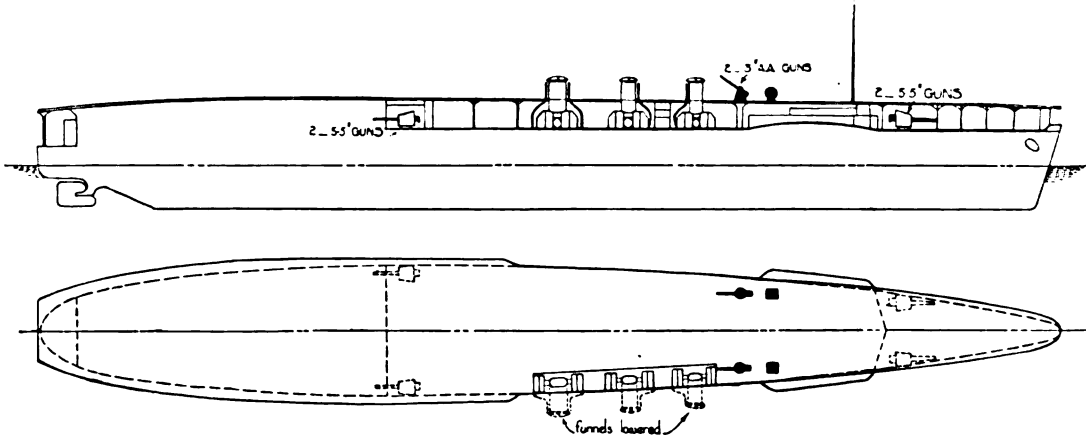
Length (on W.L.), 548 ft. ; 7,100 tons ; speed, 26 knots ; completed, 1933.
Armament, 12—5.1-in. A.A. Accommodation for 24 planes.

(P96)

JAPAN.

AIRCRAFT CARRIER.

Hosho

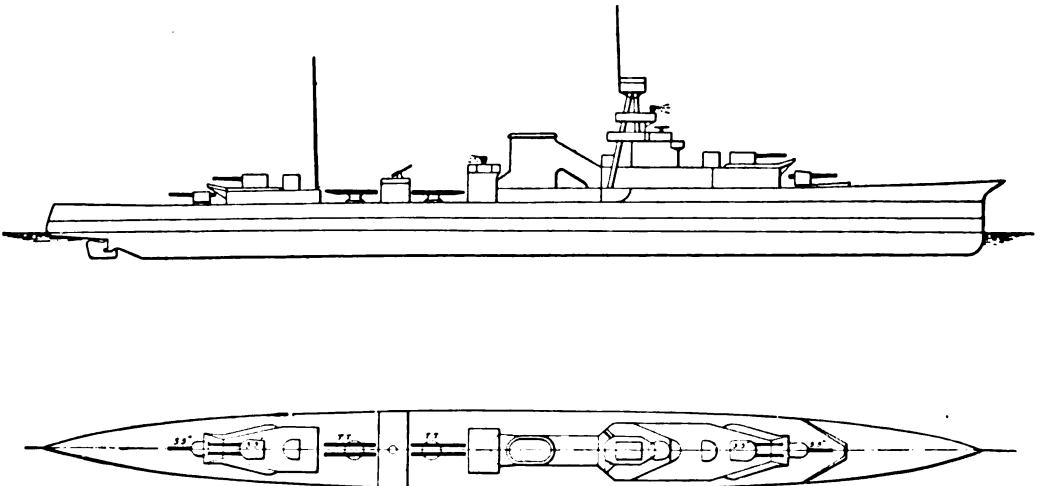


Displacement, 7,470 tons; Length B.P., 510 ft.; Speed, 25 knots; Completed, 1922.
 Armament, 4—5.5-in.; 2—3-in. A.A.; Carries about 20 planes; Fitted with gyro-stabiliser.
 Funnels hinge outboard.

JAPAN.

LIGHT CRUISER

Yubari.

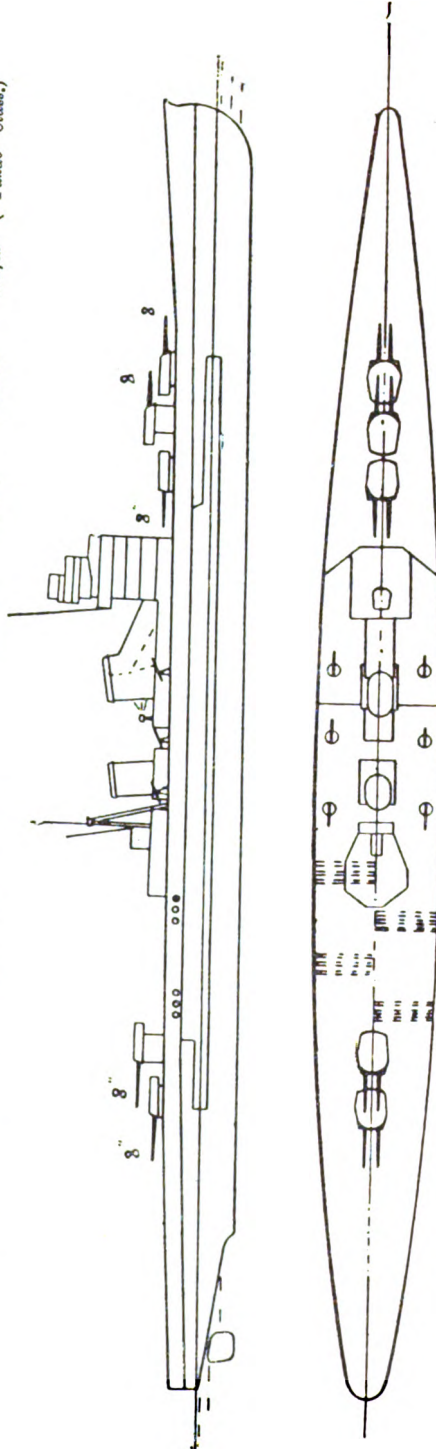


Length (extreme), 465 ft.; Length B.P., 435 ft.; 2,800 tons; Speed, 33 knots. Completed, 1923.
 Armament, 6—5.5-in.; 1—3 in. A.A.; 2 M : 2 twin 21-in. torpedo tubes; 34 mines.
 Correction to plan.—Masts and funnel raked aft.

JAPAN.

CRUISERS,

Nachi.	Myoko.	Ashigara.	Haguro.	(<i>"Nachi" Class.</i>)	Atago.*	Takao.*	Chokai.*	Maya.*	(<i>"Takao" Class.</i>)
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Length (extreme), 850 ft. (*"Takao" Class*); 640 ft. (*"Nachi" Class*); *"Nachi" Class*, 10,000 tons; *"Takao" Class*, 9,850 tons; Speed, 33 knots. Armament, 10—8-in.; 8—4-7-in. A.A.; 12—21-in. torpedo tubes; 2 catapults; 4 aircraft.

* These have 4—4-7-in. A.A. and 8—21-in. torpedo tubes.

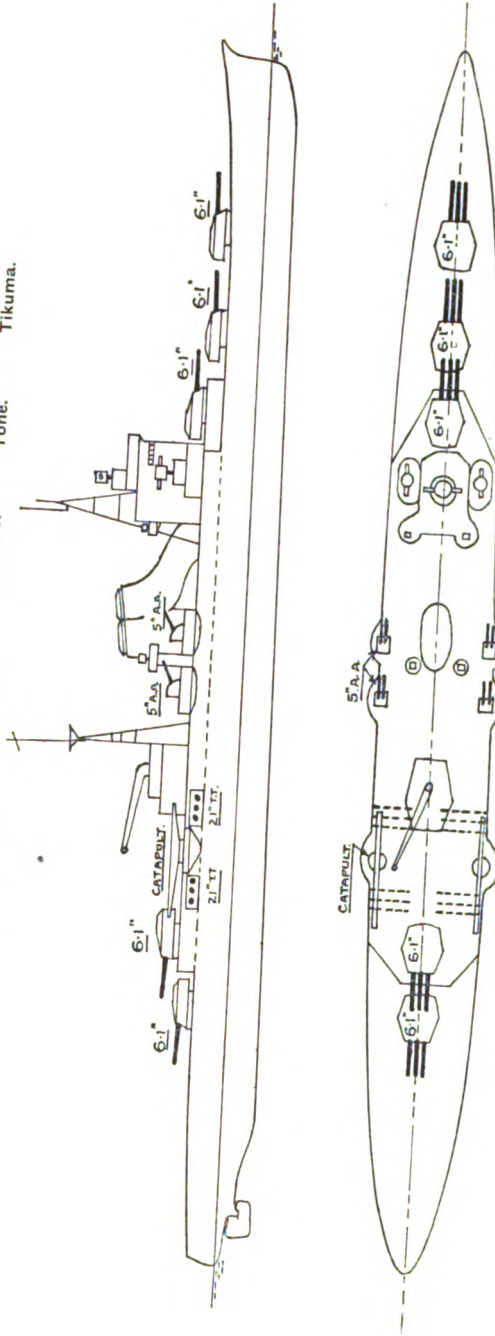
Corrections to plan.—In the *"Takao" class* the after funnel is vertical, and the torpedo tubes are beneath the funnels on a deck higher. The four 4-7-in. A.A. guns are also a deck higher. Foremast has four braced legs. In the *"Nachi" class* the foremost pair of 4-7-in. A.A. guns are a deck higher. Catapults fitted abaft mainmast.

JAPAN.

CRUISERS.

"Mogami" Class.

Mogami.	Mikuma.	Suzuya.	Kumano.	Tone.	Tikuma.
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Length (extreme), 640 ft.; 8,500 tons; Speed, 33 knots.
 Armament, 15—6.1 in.; 8—5-in. A.A.; 12—21-in. torpedo tubes; 2 catapults, 4 aircraft.

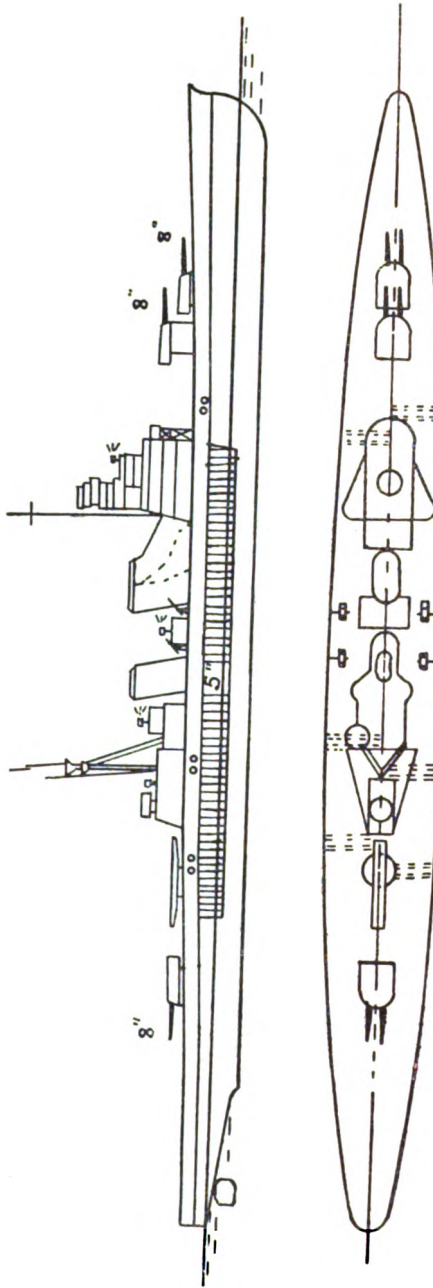
Mogami and Mikuma completed, 1935; Suzuya, 1936; Kumano, 1937; Tone and Tikuma still under construction.

JAPAN.

CRUISERS.

"Furutaka" Class.

Aoba, Kinugasa.



Length (extreme), 595 ft. ; 7,100 tons ; Speed, 33 knots. Completed, 1927.

Armament, 6—8-in. ; 4—4.7-in. A.A. ; 12—21-in. torpedo tubes ;

1 catapult ; 2 aircraft.

Correction to plan.—The tops of the funnels are square to the funnels.

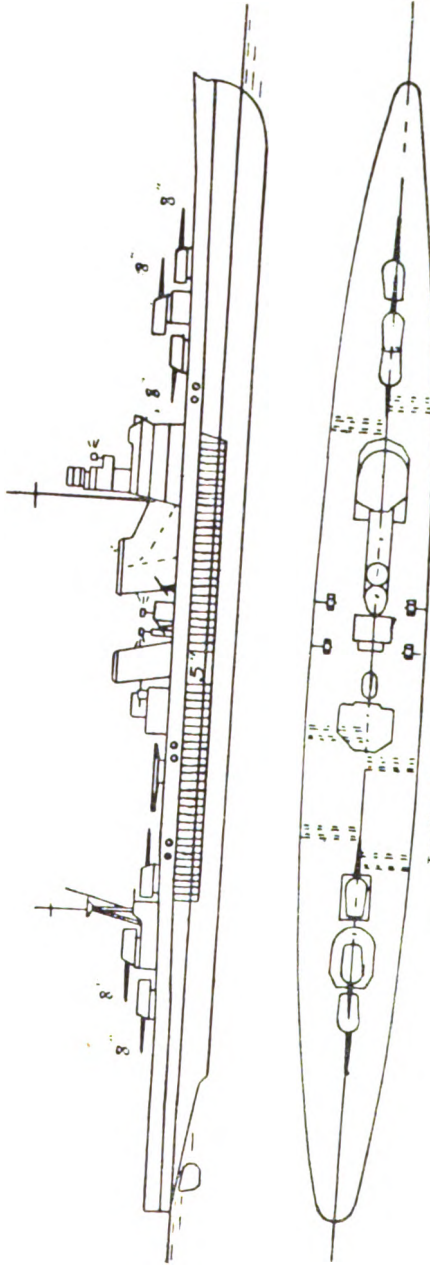
The pole mast is raked.

JAPAN.

CRUISERS,

"Furutaka" Class.

Furutaka. Kako.



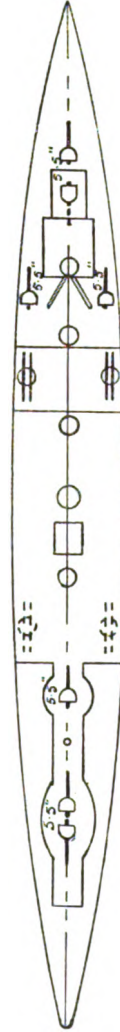
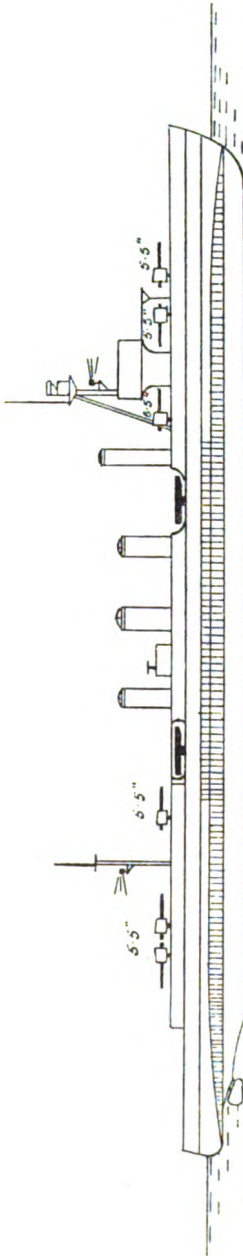
Length (extreme), 595 ft. ; 7,100 tons ; Speed, 33 knots.
Armament, 6—8-in. ; 4—4·7-in. A.A. ; 12 above-water 21-in. torpedo tubes ;
1 catapult ; 2 aircraft.
Correction to plan.—The tops of the funnels are square to the funnels.
The masts are raked.

JAPAN.

LIGHT CRUISERS.

"Sendai" Class.

Naka, Sendai, Jintsu.



Length (extreme), 535 ft. ; Speed, 33 knots ; 5,195 tons ; Completed, 1924-25.

Armament, 7-5.5-in. ; 2-3-in. A.A. ; 4 twin 21-in. torpedo tubes ;

1 seaplane ; 1 catapult.

Correction to plan.—Bows of Jintsu and Naka have been modified to give more flair.

Catapult fitted abaft mainmast which is of tripod construction and is fitted with a derrick.

Aircraft platform removed from forecastle.

(P102)

JAPAN.

LIGHT CRUISERS.

"Natori" Class.

{ Isuzu.
{ Nagara.

{ Natori.
{ Yura.

{ Kinu.
{ Abukuma.

Oi.

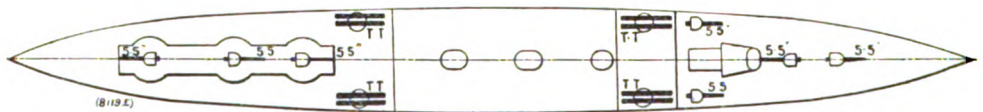
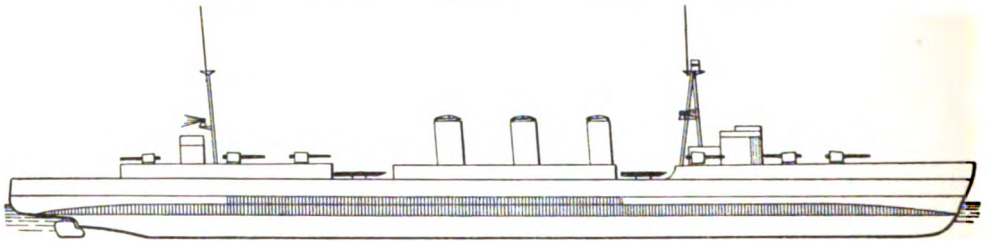
Kiso.

"Kuma" Class.

Kitakami.

Tama

Kuma.



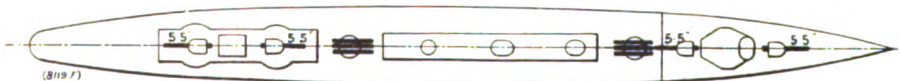
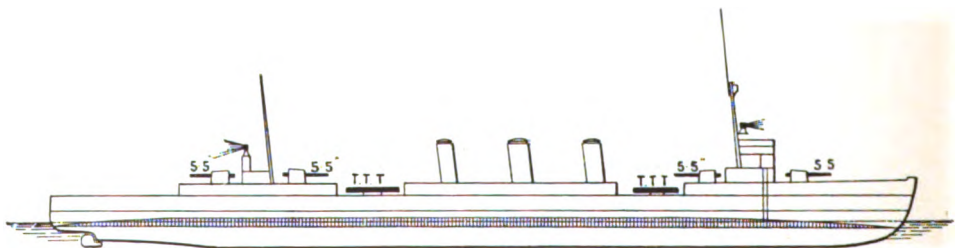
Length (extreme), 535 ft. ; Length B.P., 500 ft. ; Speed, 33 knots ; Kuma Class, 5,100 tons ; Natori Class, 5,170 tons ; Completed, 1920-23.
Armament, 7—6·5-in. ; 2—3-in. A.A. ; 2 M. ; 4 twin above-water 21-in. torpedo tubes ; 1 catapult ; 1 aircraft. Fitted for minelaying.
Corrections to plan.—Catapult fitted before mainmast, which is of tripod construction and is fitted with a derrick.

LIGHT CRUISERS.

"Tenryu" Class.

Tatsuta.

Tenryu.



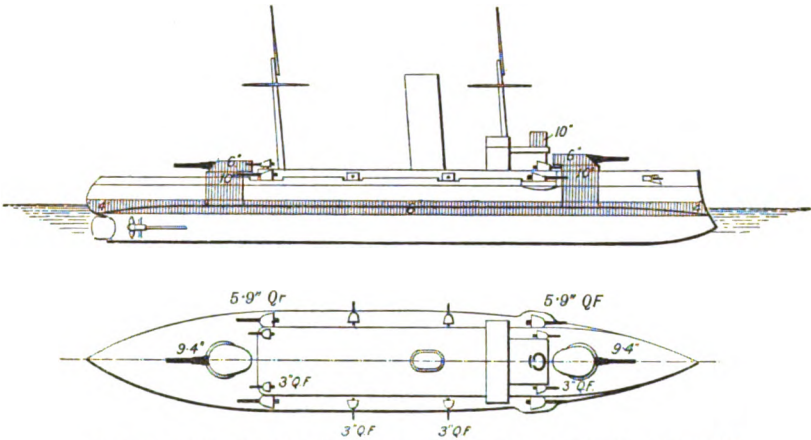
Length (extreme), 468 ft. ; Speed, 31 knots ; 3,230 tons ; Completed, 1919.
Armament, 4—6·5-in. ; 1—3-in. A.A. ; 2 M. ; 2 triple above-water torpedo tubes.
Fitted for Minelaying.

(P103)

NETHERLANDS.

COAST DEFENCE SHIP.

Hertog Hendrik.

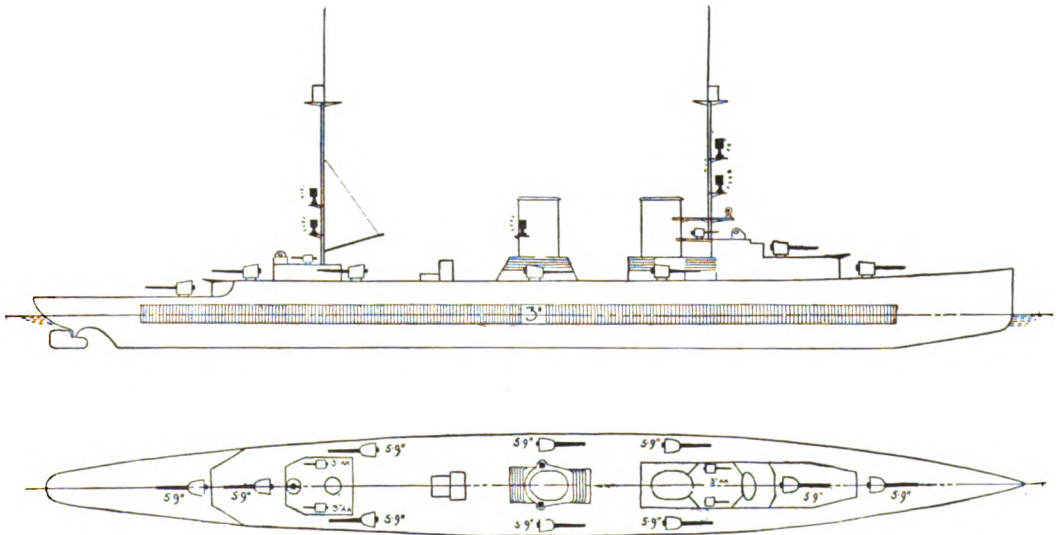


Hertog Hendrik: Length, 317 ft.; 4,371 tons; Speed, 16½ knots; Completed, 1903.
1—9.4-in.; 4—5.9-in.; 2—3-in.; 6—1 pr.; 2 M.
After gun removed.

NETHERLANDS.

CRUISERS.

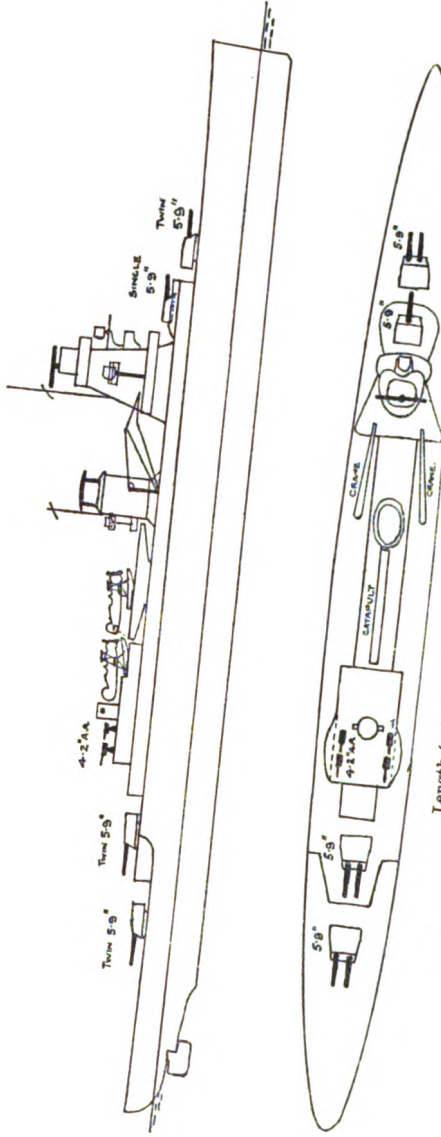
Java. Sumatra.



Length, 509½ ft.; 6,670 tons; Speed, 31 knots; Completed, 1925-26.
Armament, 10—5.9 in.; 6—1.5 in.; 4—2 pr.; 8 M.
40 mines; 2 seaplanes

Corrections to plan —These cruisers have been reconditioned. The 4—3-in. A.A. have been removed. The mainmast has been shortened, moved forward, and fitted with derrick and searchlights. Main topmast removed. 3—4-cm. machine guns have been fitted each side of the after deck house. The forward 4-sided 5.9-in. have been raised a deck to the signal deck, which has been extended aft for the purpose. Fore topmast shortened and foremast made larger. Cranes fitted abreast foremost funnel. Aircraft stowed between funnels.

NETHERLANDS.
CRUISER.
De Ruyter.



Length (extreme), 560 ft.; 6,450 tons; Speed, 32 knots.
Armament, 7—5.9-in.; 10—1.5-in. A.A.; 8—5-in. A.A.; 4 M.G.; 1 catapult; 2 seaplanes.
Completed, 1936.
Correction to plan.—Funnel top modified.

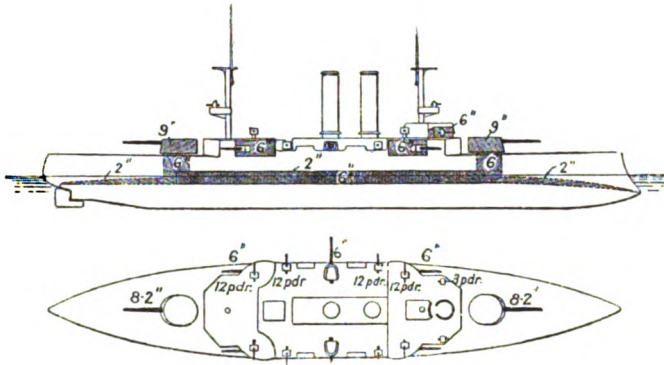
(P105)

NORWAY.

COAST DEFENCE SHIPS.

Norge.

Eidsvold.



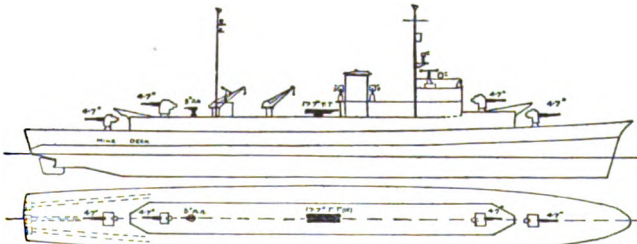
Length, 310½ ft.; 4,166 tons; Speed, 16·5 knots; Completed, 1901.

Armament, 2—8·2-in.; 6—5·9-in.; 8—3-in.; 2—3-pr.; 2 submerged 18-in. torpedo tubes.
Correction to plan.—Derrick fitted on fore side of mainmast.

NORWAY.

MINELAYER AND TRAINING SHIP.

Olav Trygvason.



Length, 319½ ft.; 1,747 tons; speed, 21½ knots; Completed, 1934.

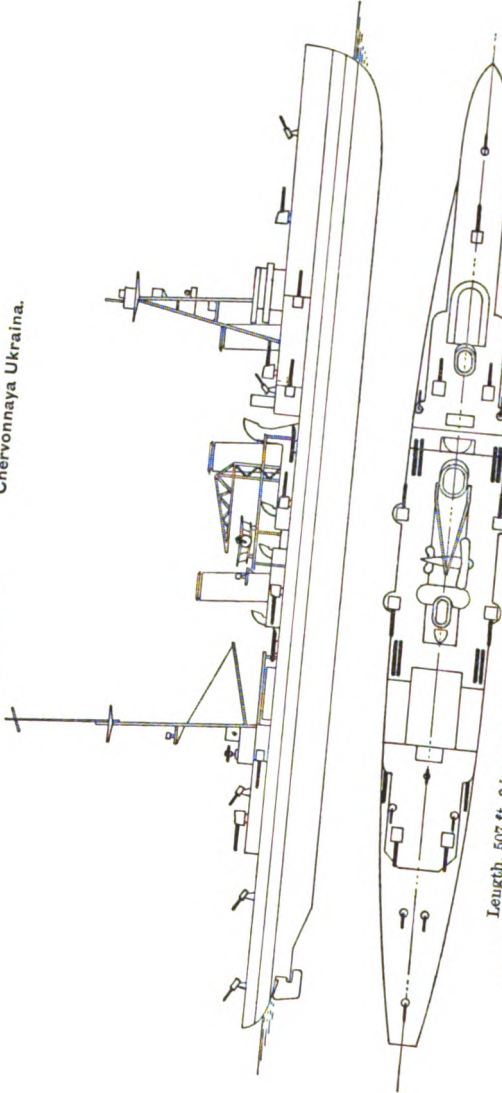
Armament, 4—4·7-in.; 1—3-in. A.A.; 2—17·7-in. torpedo tubes.
280 mines.

Correction to plan.—Both cranes are fitted abreast the mainmast.

SOVIET UNION.
CRUISERS.

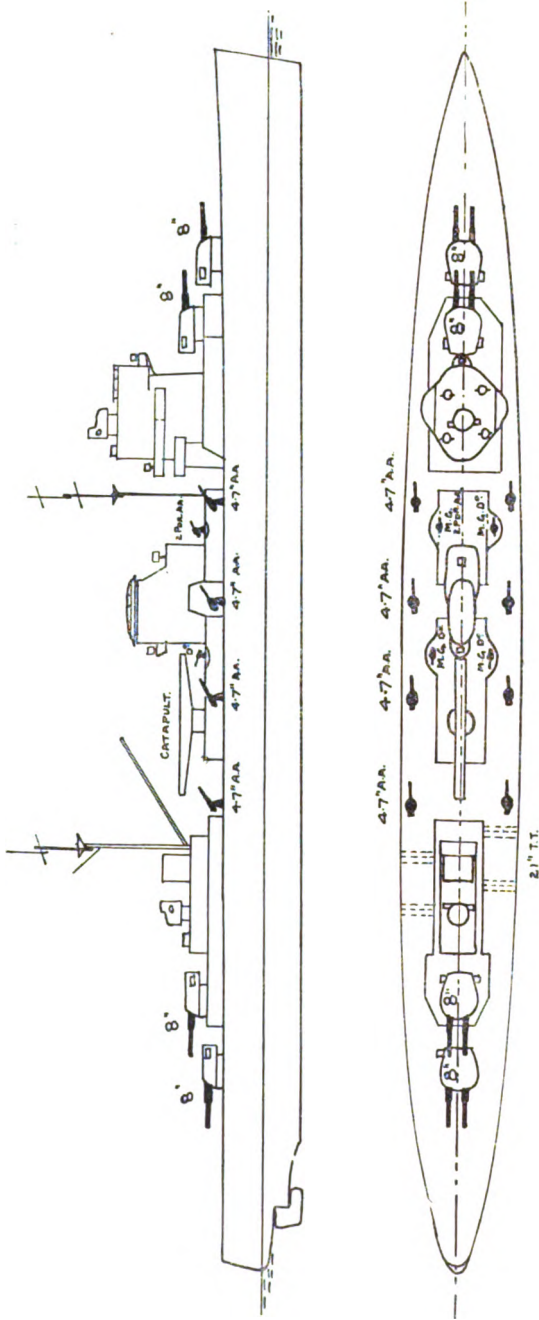
Profintern.

Chervonnaya Ukraina.



Length, 507 ft. 9 ins.; Displacement, 7,800 tons; Speed, 23½ knots; Completed, 1924-25.
Armament, 15-5.1-in.; 4-4-in.; 4-3-in. A.A.; 4 M.; 12-21-in. torpedo tubes; 100 mines; 2 seaplanes.

SPAIN.
CRUISER.
Canarias.



Length (extreme), 636 ft. ; 10,000 tons ; 33 knots ; Completed, 1935.
Armament, 8—8-in. ; 8—4-7-in. A.A. ; 8—2-pdr. A.A. ; 12—21-in. torpedo tubes ; 1 catapult ; 2 aircraft.
Main topmast removed.

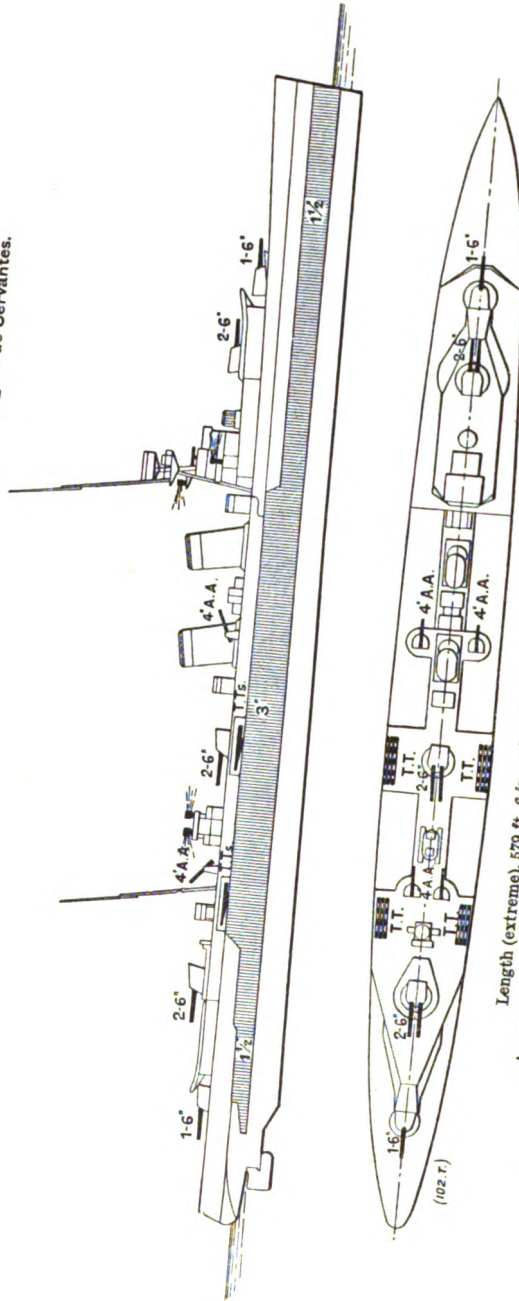
SPAIN.

CRUISERS.

Libertad (*ex-Principe Alfonso*).

Almirante Cervera.

Miguel de Cervantes.



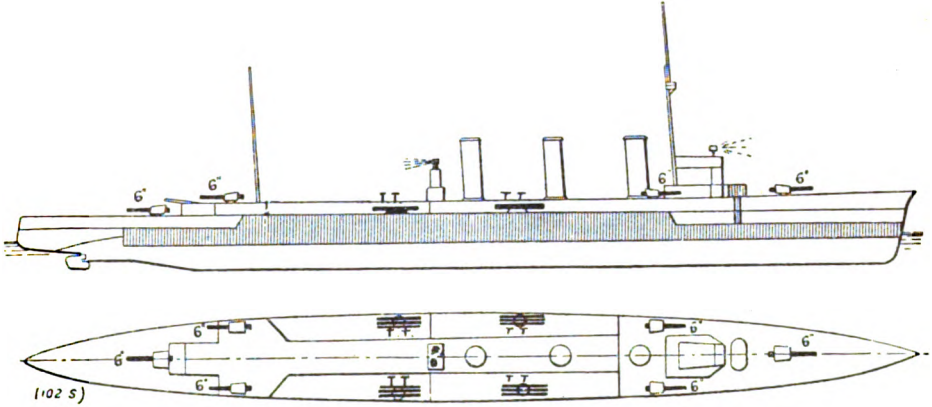
Length (extreme), 579 ft. 6 in.; Length B.P., 545 ft.; 7,475 tons; Speed, 33 knots.
 Armament, 8-6-in.; 4-4-in. A.A.; 2-3 pr.; 4 triple above-water torpedo tubes (21-in. torpedoes).
 Corrections to plan.—The mainmast is tripod. Fore topmast and top gallant mast removed. Main topgallant mast fitted.

(P109)

SPAIN.

LIGHT CRUISER.

Mendez Nuñez.



Length (extreme), 462 ft. ; Length B.P., 439 ft. ; 4,509 tons ; Speed, 29 knots. Completed, 1924.
Armament, 6—6-in. ; 4—3-pr. A.A. ; 4 M. ; 4 above-water triple torpedo tubes (21-in. torpedoes).

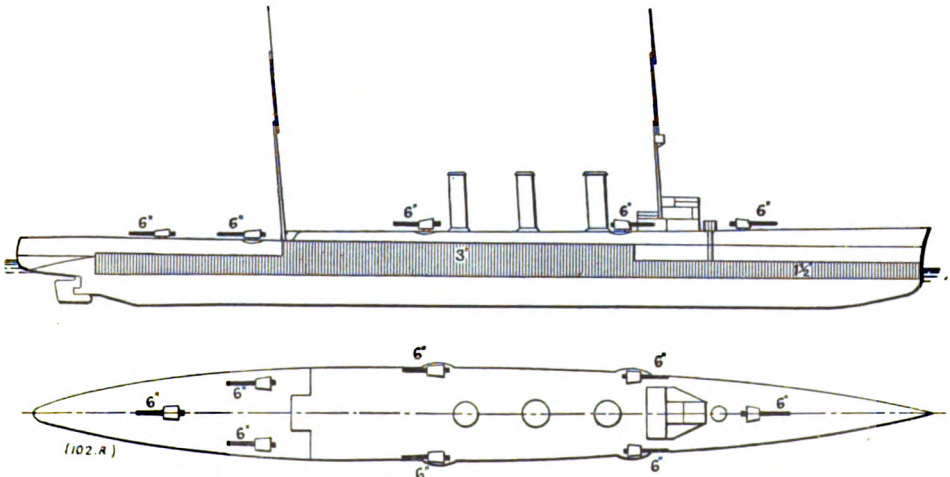
NOTE.—The armour belt is 3 ins. thick, tapering to 1½ ins. at the ends.

Corrections to plan.—The foremast is tripod. Fore topgallant mast is fitted.

A.A. Armament is fitted between second funnel and mainmast. Searchlight platform added round after funnel.

LIGHT CRUISER.

(Navarra (*ex-Republica, ex-Reina Victoria Eugenia*)).



Length (extreme), 462 ft. ; 4,857 tons ; Speed, 25½ knots ; Completed, 1923.

Armament, 6—6-in. ; 4—3-pr. A.A. ; 4 M. ; 1 L. ; 4—21-in. torpedo tubes.

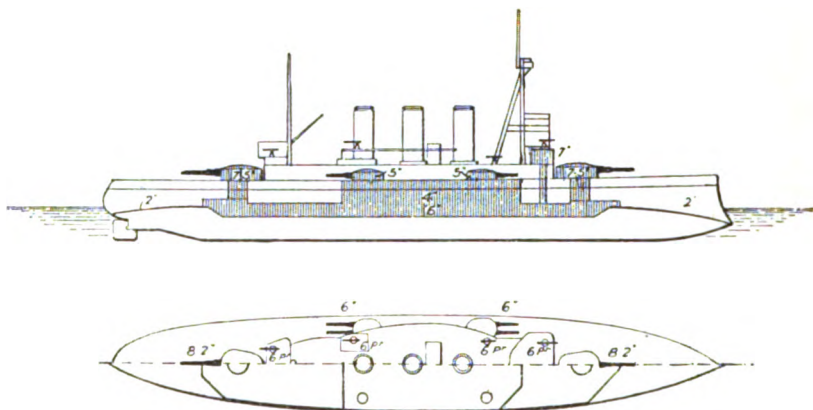
Corrections to plan.—Foremost funnel and masts removed. Tower built in place of foremast and superstructure built in place of mainmast and fitted with pole masts. A.A. Armament fitted in way of funnels. Upper deck extends further aft.

(P110)

SWEDEN.

BATTLESHIP.

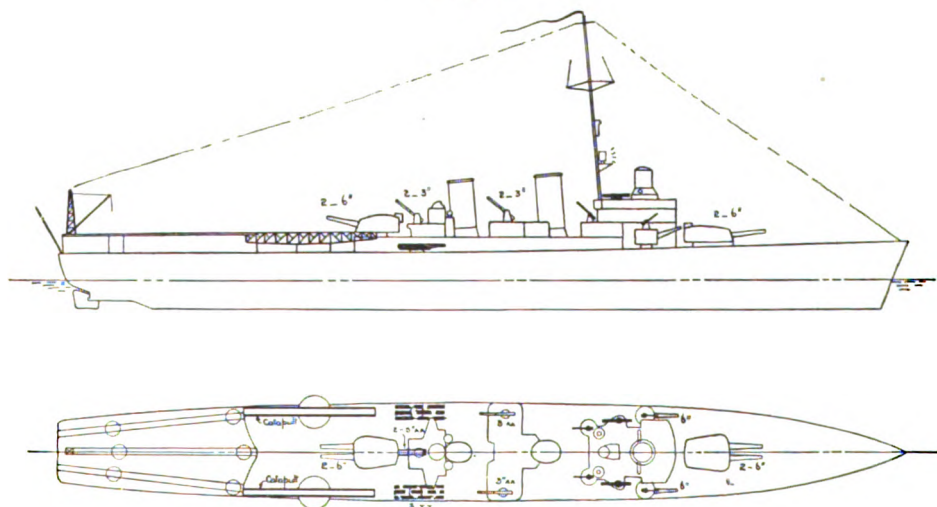
Oscar II.



Length, 313·6 ft. ; 4,250 tons ; Speed, 18 knots ; Completed, 1907.
 Armament, 2—8·3-in. ; 8—5·9-in. ; 8—6-pr. ; 1—1-pr. ; 2 submerged 18-in. torpedo tubes.
 Searchlights fitted on foremast and mainmast.

AIRCRAFT CRUISER.

Gotland.



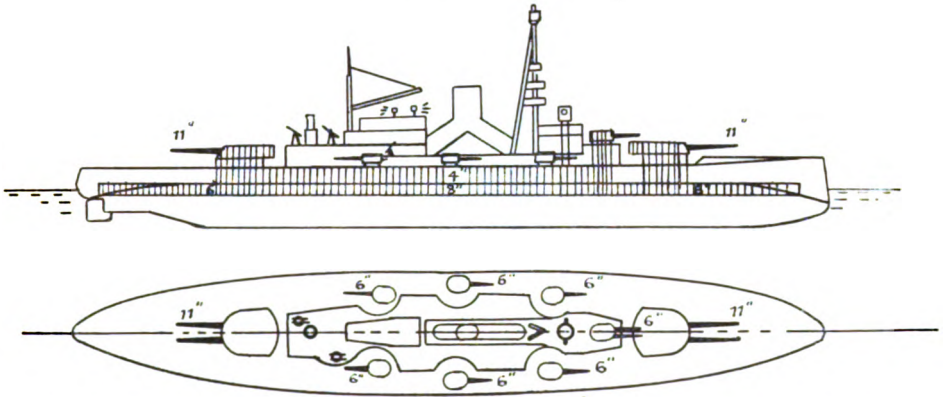
Length, 442 ft. ; 4,700 tons ; 33,000 H.P. ; Speed, 27 knots ; Completed, 1934.
 Armament, 6—6-in. ; 4—3-in. A.A. ; 4 M. ; 6—21-in. torpedo tubes ; 1 catapult ; 8 seaplanes
 Correction to plan.—1 catapult is fitted on middle line.

(P111)

SWEDEN.

COAST DEFENCE SHIPS.

Gustav V. Sverige.
(As reconstructed 1924-29.)

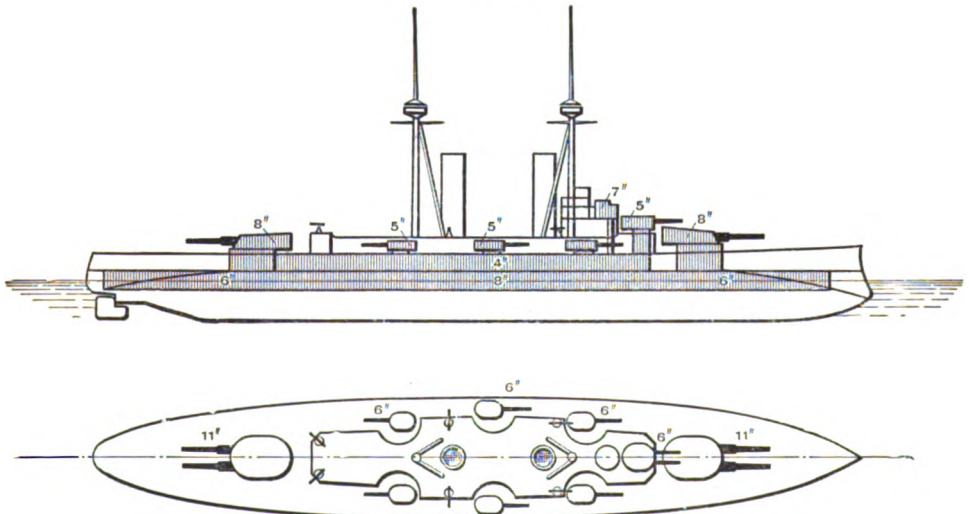


Length, 396.7 ft. ; Sverige, 6,899 tons ; Gustav V, 7,100 tons ; Speed, 23 knots ; Completed, 1917-1921.
Armament, 4—11-in. ; 8—5.9-in. ; 4—3-in. ; 2—6-pr. ; 6 M.
Correction to plan.—Fore topmast added. Bridgework extended. Mainmast removed. In Sverige the mainmast is shortened ; two funnels are fitted, the after one being vertical and the forward one bent.

SWEDEN.

COAST DEFENCE SHIP.

Drottning Victoria.



Length, 396.7 ft. ; 6,899 tons ; Speed, 23 knots ; Completed, 1921.

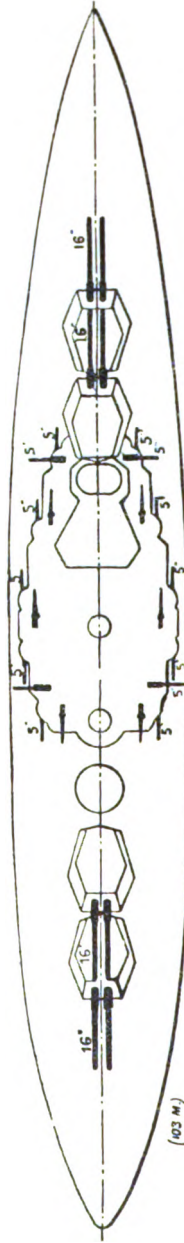
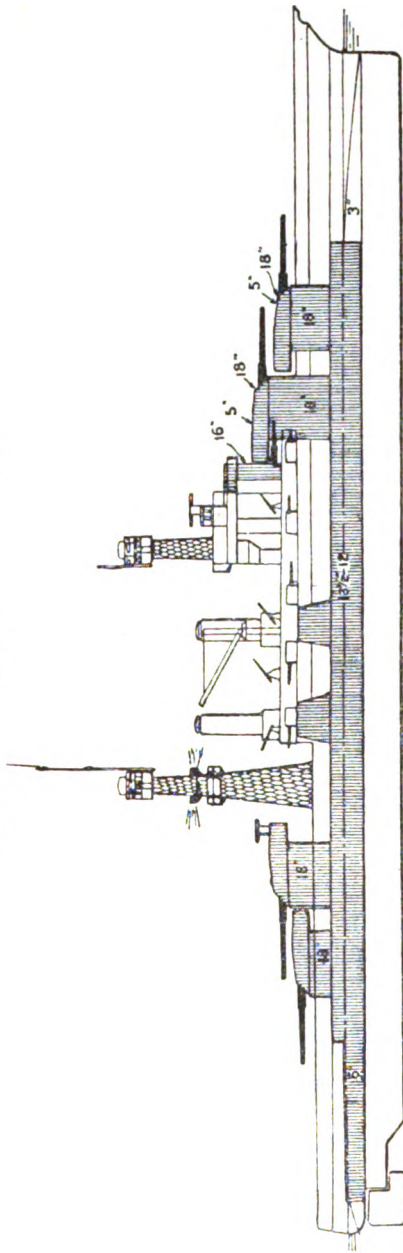
Armament, 4—11-in. ; 8—5.9-in. ; 4—3-in. ; 2—6-pr. ; 9 M.

Mainmast removed and bridgework modified. Searchlight platform and A.A. guns fitted abaft after funnel.

UNITED STATES.

BATTLESHIPS.

Colorado. Maryland. West Virginia.



Length (extreme), 624 ft. ; Length W.L., 600 ft. ; Speed, 21 knots ; 31,500-32,500 tons ; Maryland, completed, 1921 ; Colorado and West Virginia, completed, 1923.

Armament, 8-16-in. ; 12-5-in. ; 8-5-in. A.A. ; 4-6-pr. ; 2-1 pr. ; 2 submerged 21-in. torpedo tubes ; 2 catapults ; 3 aircraft.

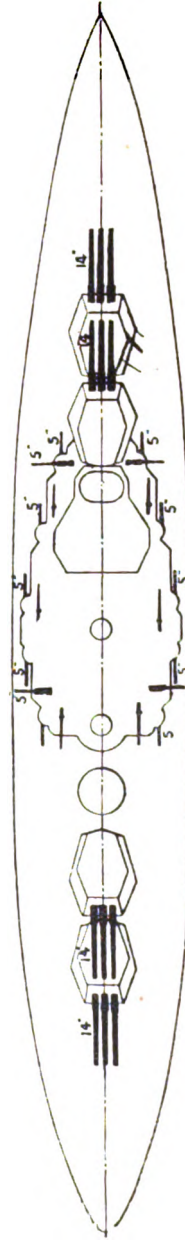
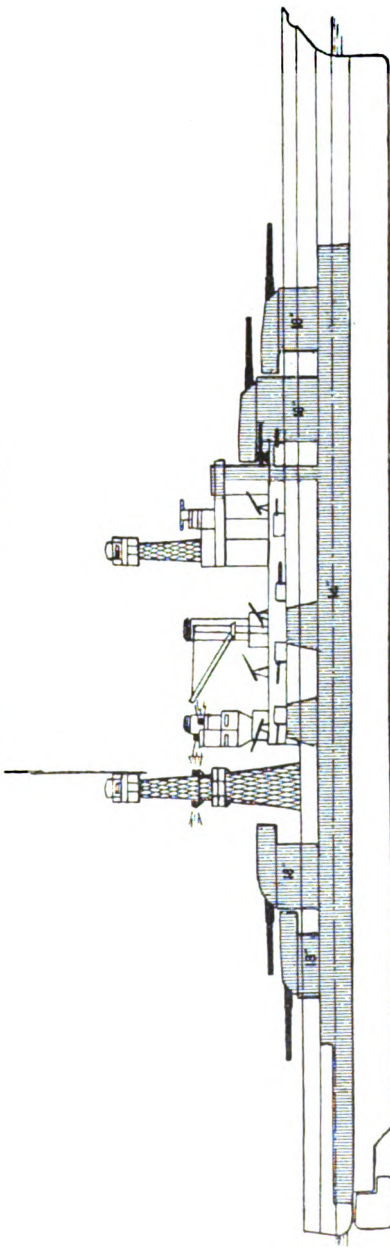
Corrections to plan.—Catapults fitted on "X" turret and quarter deck. Crane fitted at stern. Main topgallant mast removed. Range finder fitted on B turret of Maryland.

UNITED STATES.

BATTLESHIPS.

California.

Tennessee.

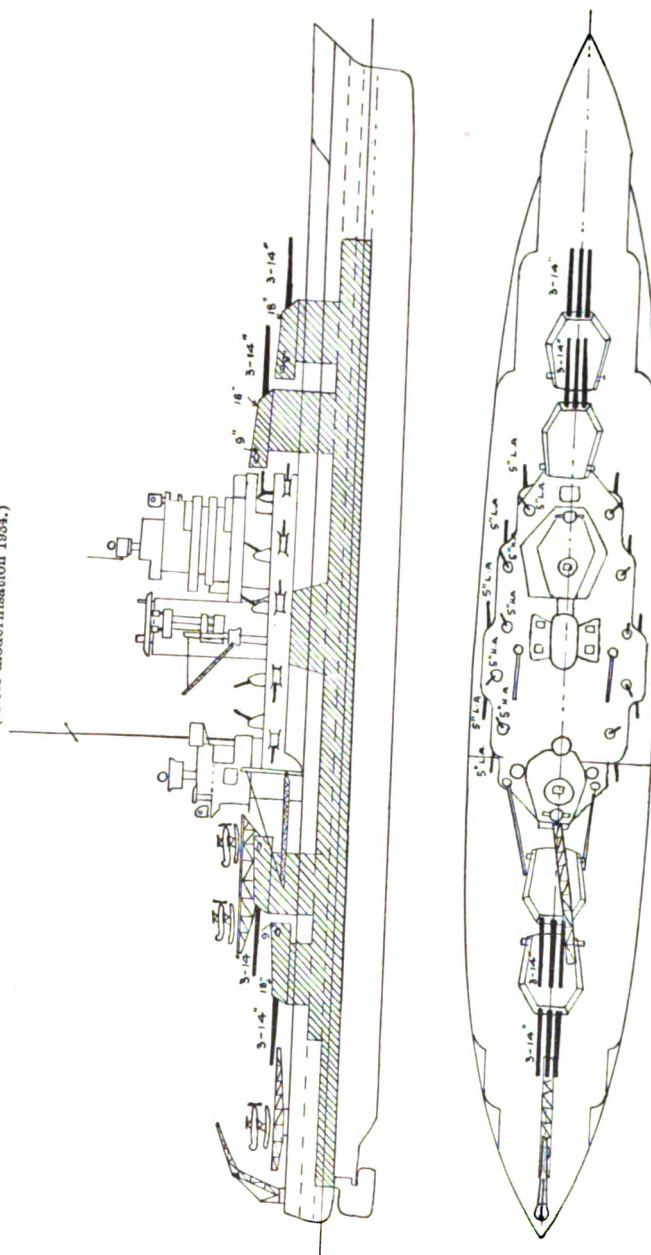


Length (extremo), 624 ft.; Length W.L., 600 ft.; Speed, 21 knots; 32,600-32,300 tons; Completed, 1920-21.
 Armament, 12-14-in., 12-5-in., 8-5-in. A.A.; 4-6-pr.; 2-1-pr.; 2 submerged 21-in. torpedo tubes,
 2 catapults (one right aft on Quarter Deck and one "X" turret); 3 seaplanes,
 Main topmast shortened. Crane at stern.

UNITED STATES.
BATTLESHIPS.

New Mexico.
(After modernisation 1934.)
Mississippi.

Idaho.



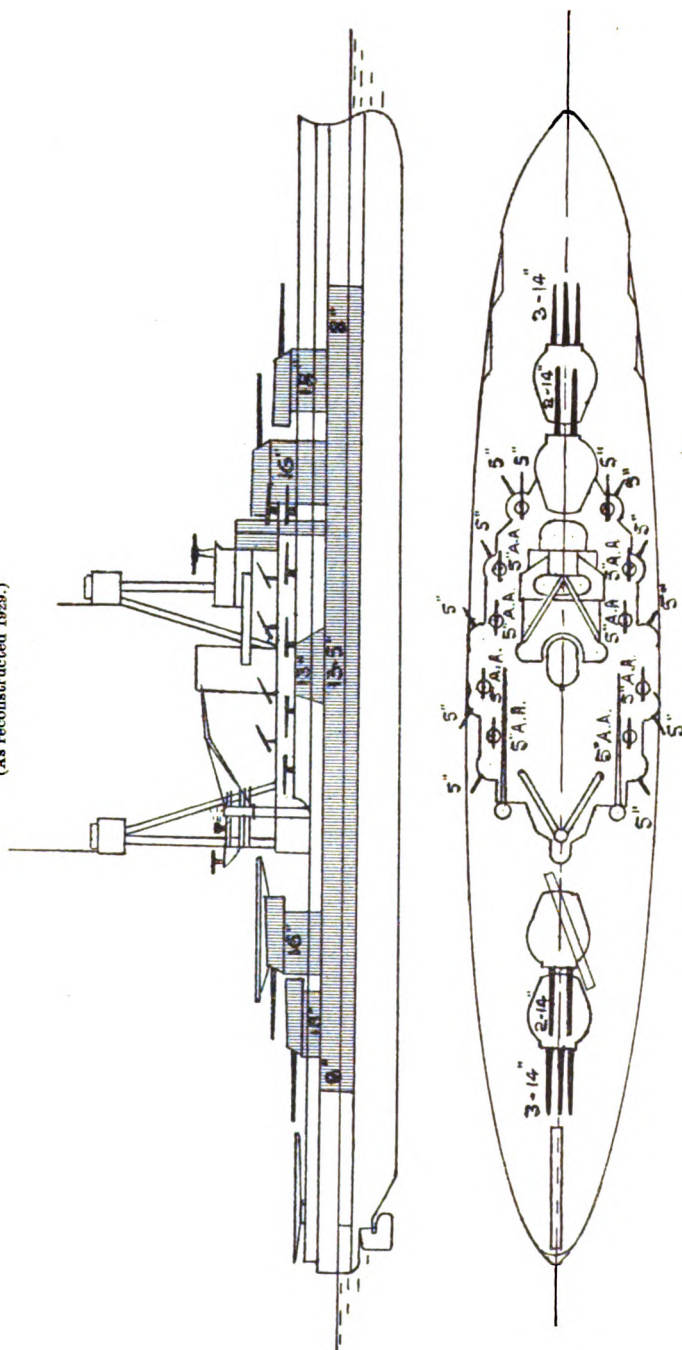
Length (extreme), 624 ft. ; Length, w. L., 600 ft. ; Speed, 22½ knots ; 33,000 tons ; Idaho and New Mexico, 33,400 tons ; Completed, 1917-1919 ; Modernised, 1931-1934. Armament, 12-14 in. ; 12-6 in. ; 8-6 in. A. A. ; 4-6 pr. (Idaho, 4-3 pr.) ; 2-1 pr. ; 2 submerged 21-in. torpedo tubes ; 2 catapults ; 3 sea planes.

UNITED STATES.

BATTLESHIPS.

Nevada. Oklahoma.

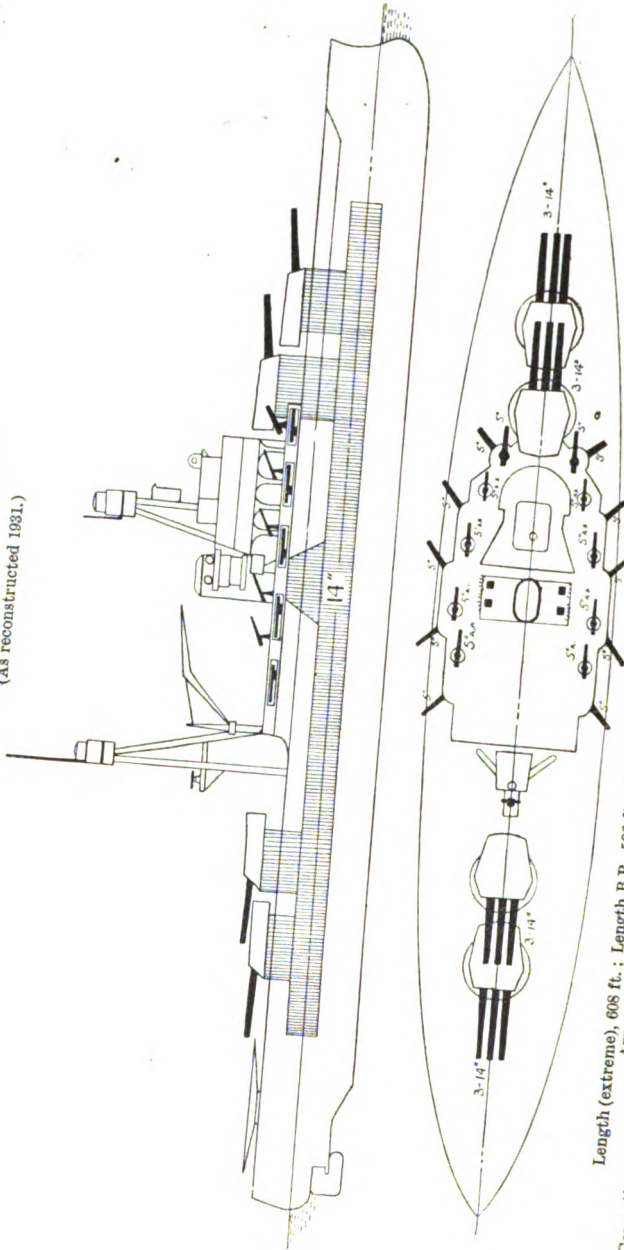
(As reconstructed 1929.)



Length (extreme), 583 ft. ; Length W. L., 575 ft. ; Speed, 20.5 knots ; 29,000 tons.

Armament, 10-14-in. ; 12-5-in. A.A. ; 4-6-pr. (Oklahoma, 4-3-pr.) ; 2-1-pr. ; 2 M. ; 2 L. ; 2 catapults ; 3 aeroplanes.

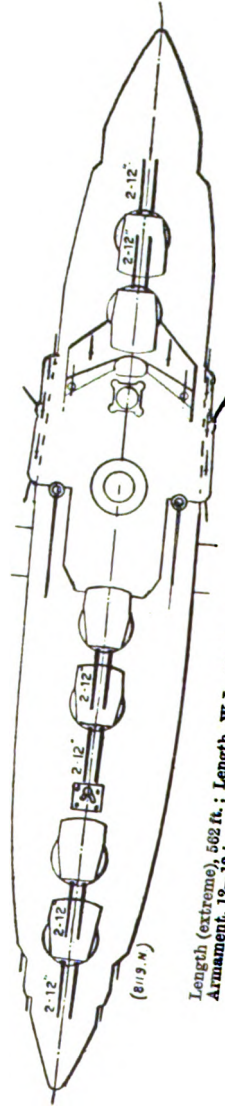
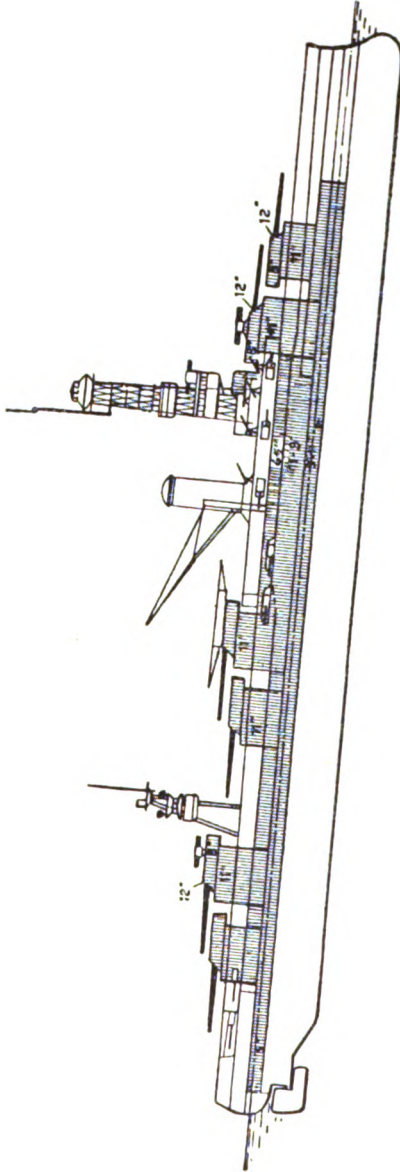
UNITED STATES.
BATTLESHIPS.
Arizona.
Pennsylvania.
(As reconstructed 1931.)



Length (extreme), 608 ft. ; Length B.P., 596 ft. ; Speed, 21 knots ; Pennsylvania 33,100 tons ; Arizona 32,600 tons ; Completed, 1916.
Armament, 12-14-in. ; 12-6-in. ; 8-5-in. A.A. ; 4-3-pr. ; 2-1-pr. ; 2 M. ; 2 L. ; 2 catapults ; 3 aircraft.
Corrections to plan. —Catapults fitted on "X" turret and quarter deck. Crane fitted at stern. Main topmast is on fore side of mast structure.

UNITED STATES.
BATTLESHIP.

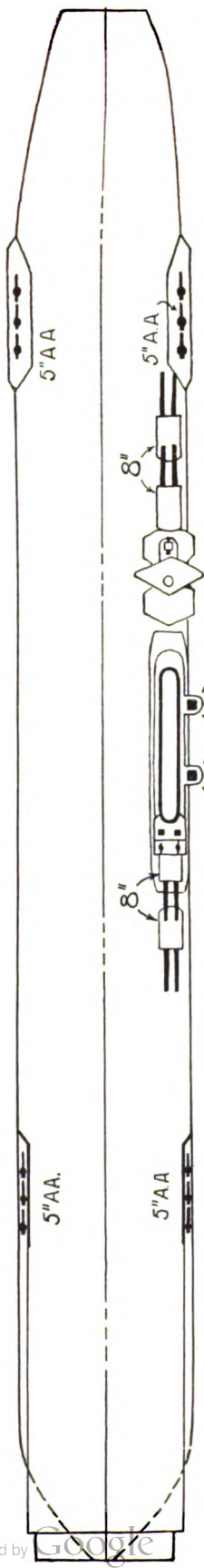
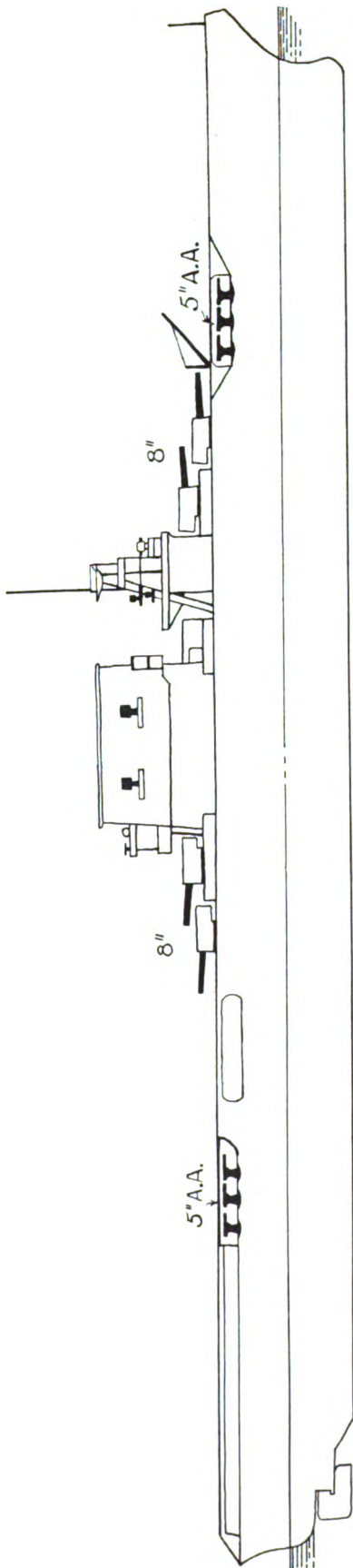
(As reconstructed 1927.)



Length (extreme) 562 ft.; *Length, W. L.*, 555 ft.; *Speed*, 20.5 knots; 26,100 tons; Completed, 1912. *Armament*, 12—12-in.; 16—6-in.; 8—3-in. A.A.; 4—3-pr.; 2 M.; 1 catapult; 3 aircraft.

Wyoming, a sister ship, has been demilitarised and converted to a training ship.

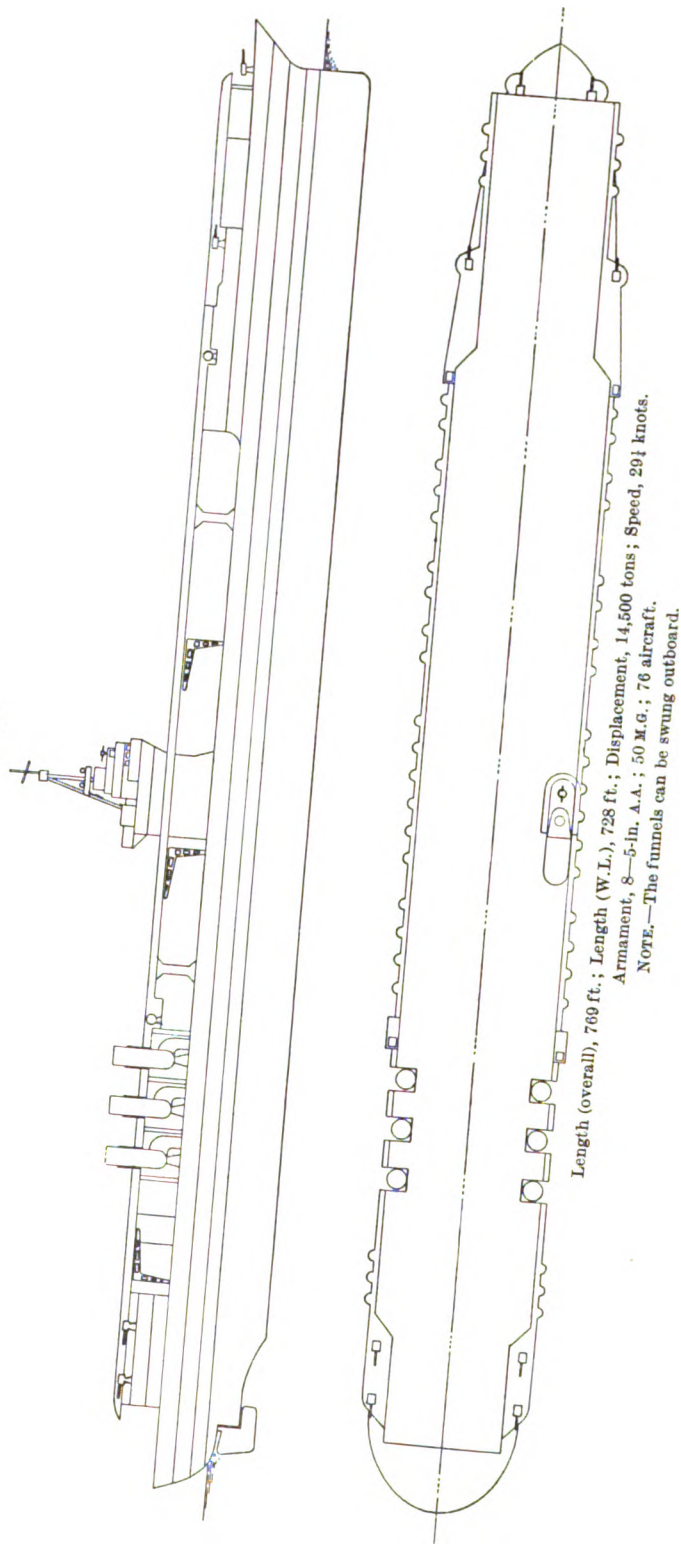
UNITED STATES.
AIRCRAFT CARRIERS.
Lexington. Saratoga.



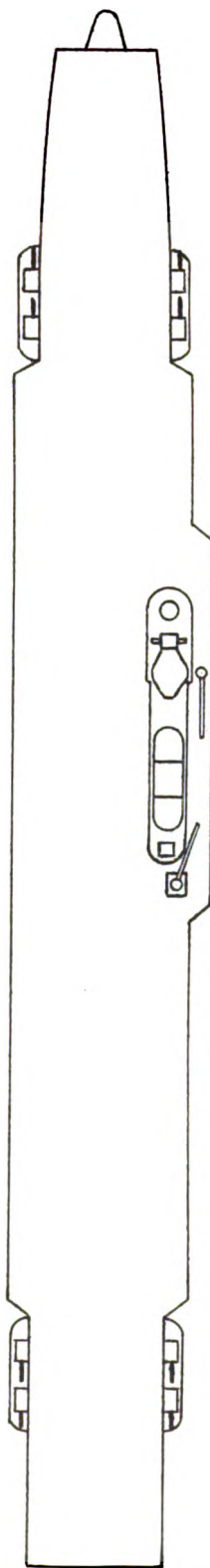
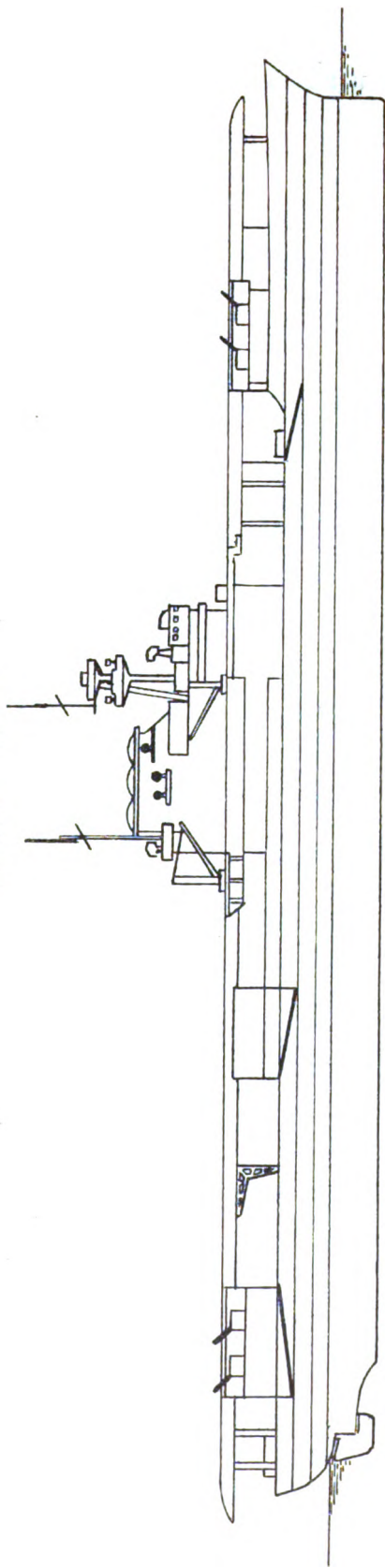
Length (extreme) Lexington, 880 ft. ; Saratoga, 888 ft. ; Speed, 33.9 knots; Completed, 1927.
Armament, 8—8-in. ; 12—5-in. A.A. ; 4—6-pr. ; Operate about 80 aircraft ; 1 catapult.
Correction to plan.—Lexington has platform round top of funnel.

UNITED STATES.
AIRCRAFT CARRIER.

Ranger.



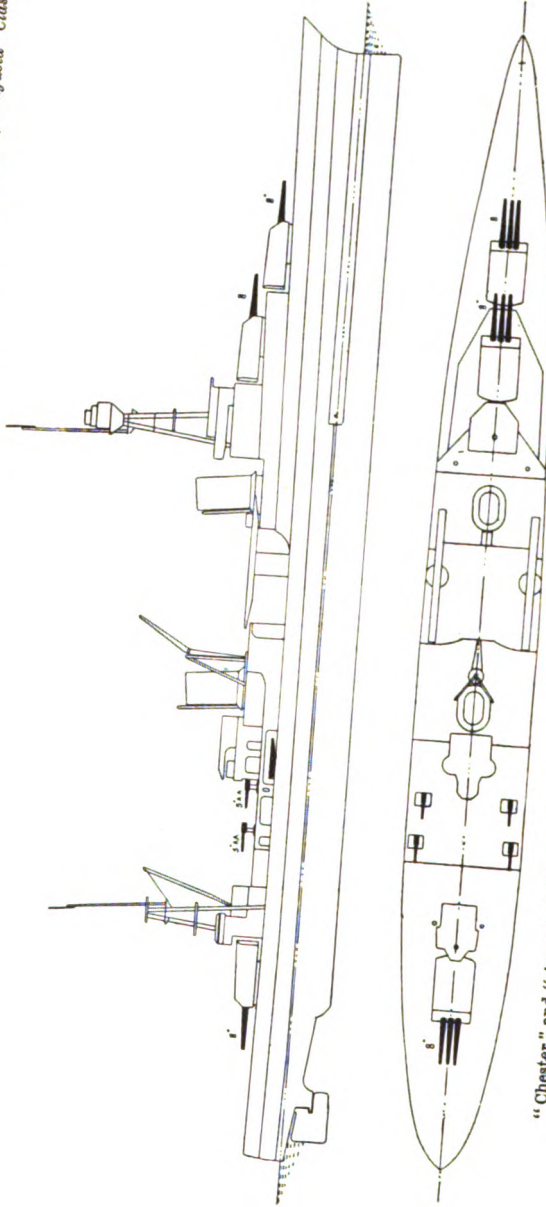
UNITED STATES.
AIRCRAFT CARRIERS.
Enterprise. Yorktown.



Length (on W.L.) 761 ft.; 19,900 tons; speed, 24 knots; completed 1936.
Armament, 8—5-in. A.A.; 16 smaller guns; 100 aircraft.

UNITED STATES.
CRUISERS.

Northampton.	Chester.	Louisville.	Chicago.	Houston.	Augusta.
		("Chester" Class.)			("Augusta" Class.)



"Chester" and "Augusta" Classes : Length (extreme), 600 ft. ; 9,050-9,300 tons ; Speed, 32½ knots ; Completed, 1930-31.
Armament, 9—8-in. ; 4—5-in. A.A. ; 2—3-pr. ; 2 triple 21-in. torpedo tubes ; 2 catapults ; 4-6 seaplanes.
Corrections to plan.—Fore topmast shortened, topgallant masts removed. Foremost funnel lengthened in "Chester" Class.

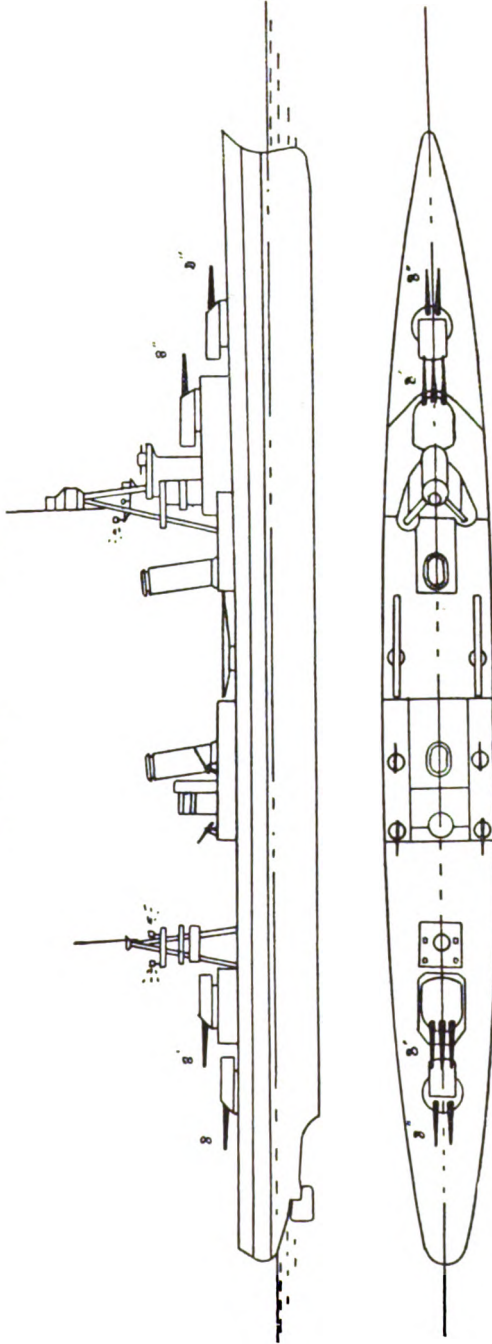
UNITED STATES.

CRUISERS,

"Pensacola" Class.

Salt Lake City.

Pensacola.



Length (extreme), 585½ ft. ; 9,100 tons ; Speed, 32.7 knots ; Completed, 1930.
Armament, 10—8-in. ; 4—6-in. A.A. ; 2—3-pr. ; 2 triple 21-in. torpedo tubes.
2 catapults ; 4 seaplanes.

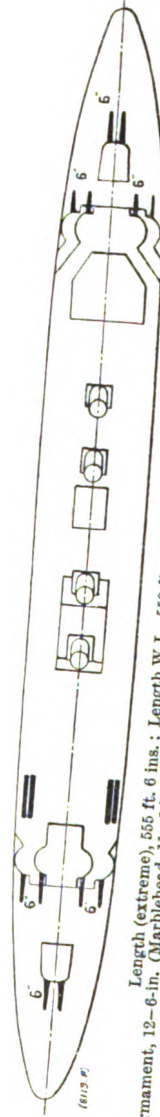
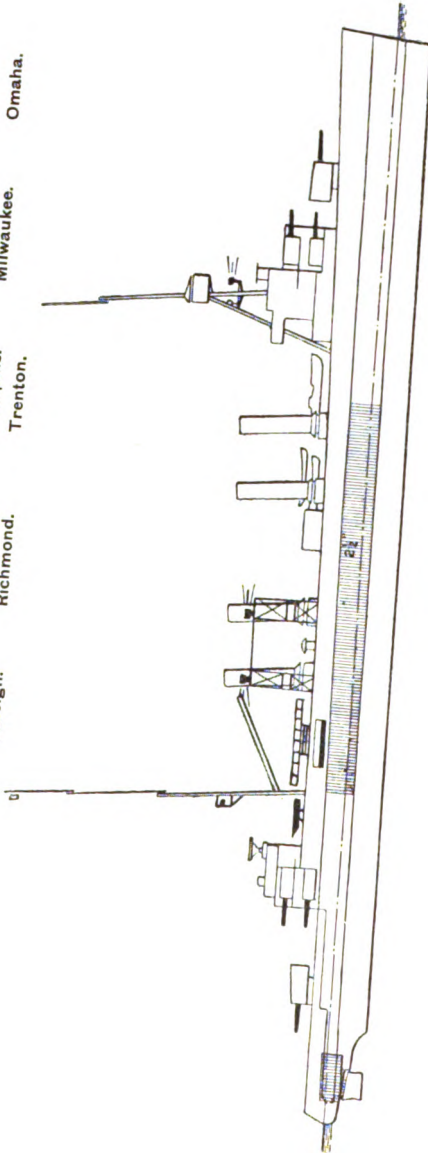
Corrections to plan.—Crane fitted on fore side of after funnel and derricks fitted on after side.

UNITED STATES.

SCOUT CRUISERS.

"Omaha" Class.

Cincinnati.	Concord.	Detroit. Raleigh.	Marblehead. Richmond.	Memphis. Trenton.	Milwaukee.	Omaha.
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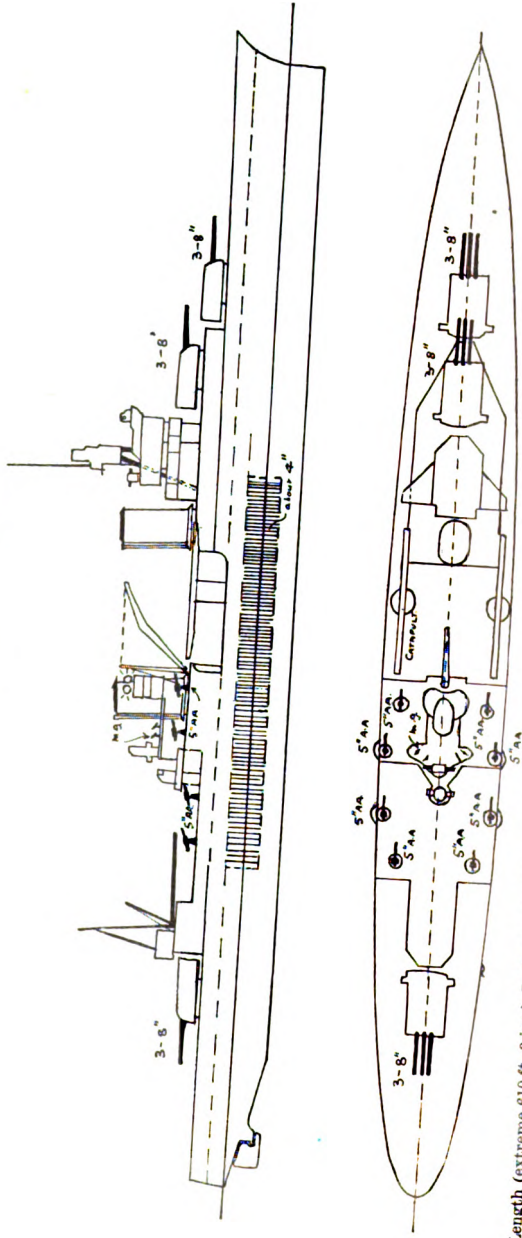
Length (extreme), 555 ft. 6 ins.; Length W.L., 550 ft.; Speed, 33.7 knots; 7,050 tons.
 Armament, 12-6-in. (Marblehead, 11-6-in.; Cincinnati, Detroit, Raleigh and Richmond, 10-6-in.); 4-3-in. A.A.; 2-3-pr.; 2 triple above-water
 Corrections to plan.—The pair of single 6-in. guns at upper deck level aft are removed in Marblehead, Cincinnati, Detroit, Raleigh and Richmond.
 In Marblehead there is a single gun on top of the after battery. Topgallant masts removed and topmasts shortened.
 Foremast head in Marblehead fitted with machine guns.

UNITED STATES.

CRUISERS.

Indianapolis.

Portland.

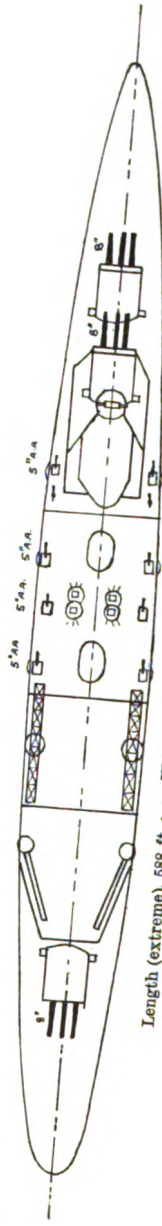
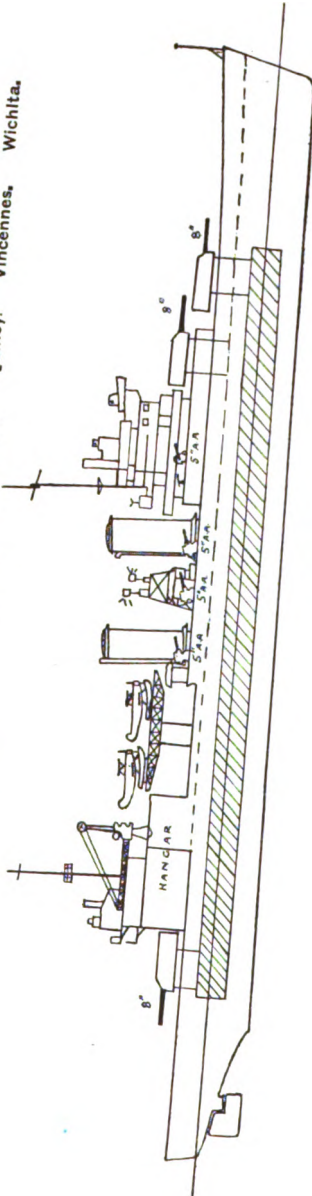


Length (extreme 610 ft. 3 ins.): Indianapolis, 584 ft. on W.L.; Portland, 582 ft. on W.L. Indianapolis, 9,950 tons; Portland, 9,800 tons. Completed, 1932-1933. Armament, 9-8-in., 8-6-in. A.A.; 10 machine guns; 2 catapults; 4-6 aircraft; 2-8-pdr. Corrections to plan.—Fore topmast is raked. Foremost funnel lengthened.

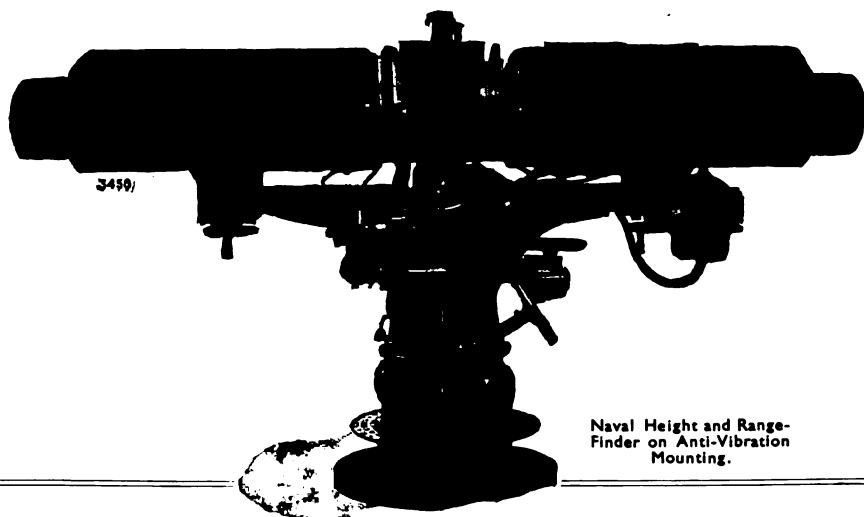
UNITED STATES.
CRUISERS.

"Astoria" Class.

Astoria. New Orleans. San Francisco. Minneapolis. Tuscaloosa. Quincy. Vincennes. Wichita.



Length (extreme), 538 ft.; on W. L., 574 ft.; 10,000 tons (std.).
Armament, 9-8-in., 8-6-in., 2-3 pr., 10 smaller; 2 catapults; 4 aircraft.
Speed, 32.7 knots. Completed, 1934-36.



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b. battleship; *b.cr.* battle cruiser; *cr.* cruiser; *a.cr.* armoured cruiser; *air.c.* aircraft carrier; *air.cr.* aircraft cruiser; *air.t.* aircraft tender; *f.l.* flotilla leader; *l.cr.* light cruiser; *cr.m.l.* cruiser minelayer; *s.cr.* scout cruiser; *s.cl.cr.* second-class cruiser; *tr. cr.* training cruiser; *d.* destroyer; *t.b.* torpedo boat; *f.c.d.* first-class destroyer; *t.b.d.* torpedo-boat destroyer; *c.d.* coast defence ship; *sea-p.c.* seaplane carrier; *a.s.* armoured ship; *a.t.* aviation transport; *m.l. & t.s.* minelaying and training ship; *a.a.cr.* anti-aircraft cruiser; *g.t.s.* gunnery training ship.

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b. battleship; *b.cr.* battle cruiser; *cr.* cruiser; *a.cr.* armoured cruiser; *a.s.* armoured ships; *a.t.* aviation transport; *air.c.* aircraft carrier; *f.l.* flotilla leader; *l.cr.* light cruiser; *cr.m.l.* cruiser mine layer; *g.t.s.* gunnery training ship; *sea-p.c.* seaplane carrier; *s.cr.* scout cruiser; *s.cl.cr.* second-class cruiser; *d.* destroyer; *t.b.d.* torpedo-boat destroyer; *c.d.* coast defence ship; *m.l. & t.s.* mine layer and training ship; *air. cr.* aircraft cruiser.

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